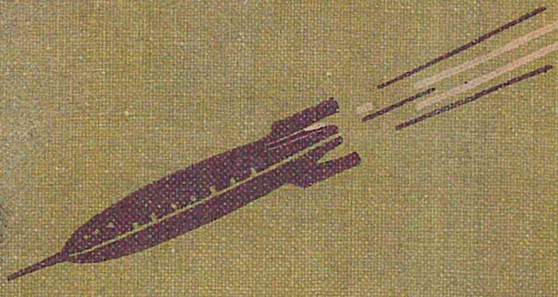
PROGRESS in Arithmetic

GRADE 5



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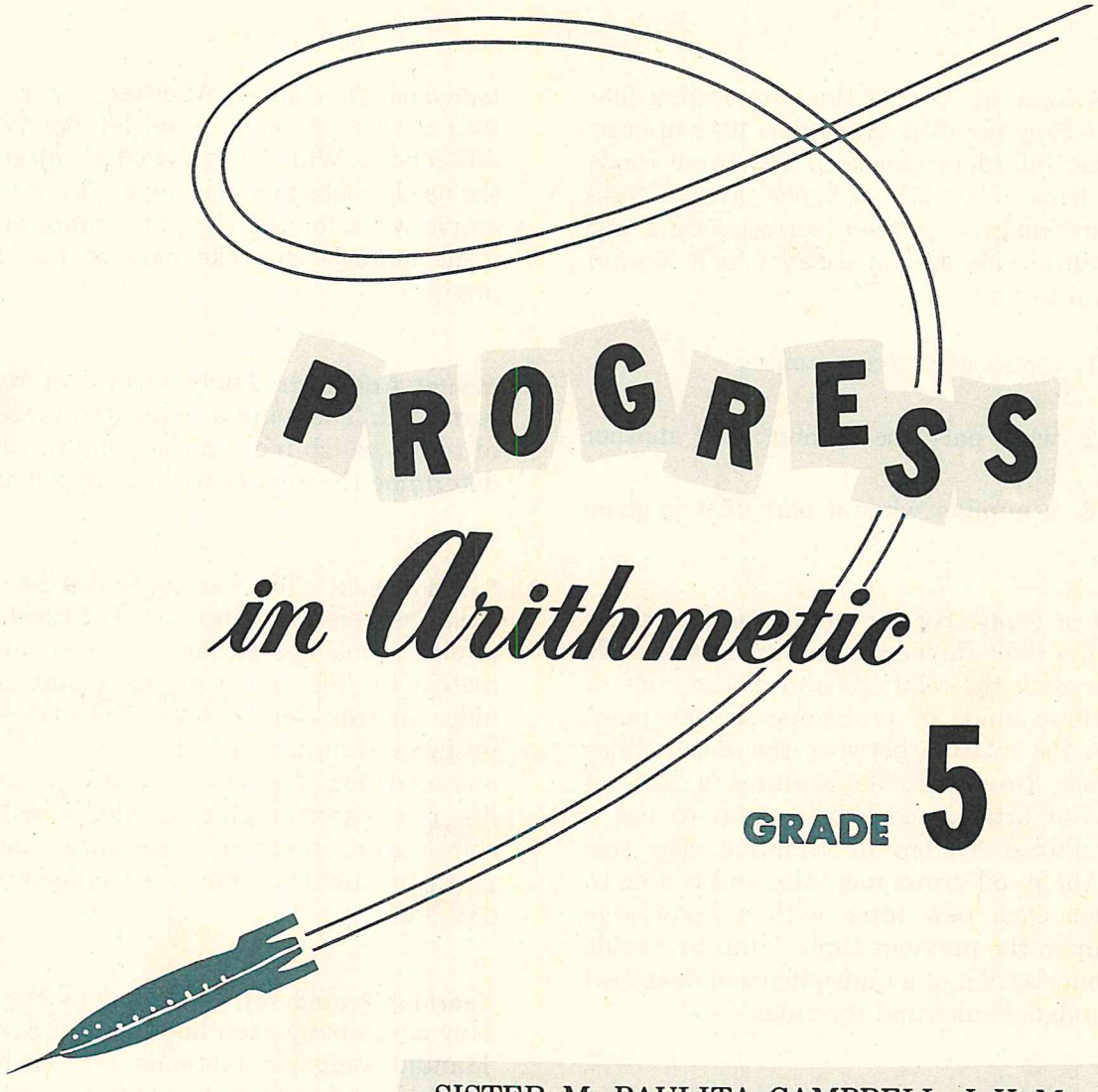

PROGRESS in Arithmetic

GRADE 5

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To The Teacher

Problem Analysis. One of the outstanding features of *Progress in Arithmetic* is its emphasis upon the interdependence of the three kinds of problems. These three types involve fractions, decimals, and their corresponding per cents. Situations are furnished which require the pupil to find:

1. a part of a given number
2. what part one number is of another
3. a number when a part of it is given

Method of Study. By the application of Basic Rules and their Reversals, the student is made familiar with the relations and distinctions of these three kinds of problems. As the pupil masters the relation between the Basic Rules and their Reversals, he acquires a general method of attack which leads him to use a single unified system of thinking. By this means the pupil grows mentally and is able to approach each new topic with a knowledge based upon the previous topic. Thus he avoids the memorization of a multiplicity of detached and unrelated rules and formulas.

Drills and Problems. Drill lessons progressing in range and difficulty are provided in abundance. Such exercises are a dynamic factor in promoting and engendering the habit of success which is essential to the progress of the pupil and to the solution of problems.

Individual Differences. Another important feature of this text is its provision for individual differences. While it is keyed to meet chiefly the needs of the average boy or girl, it furnishes ample work for the slow and supplies enrichment material to take care of the superior pupil.

Mental Arithmetic. Daily mental exercises are furnished. These are a sequential presentation of topics which require the pupil to think and determine the answer without pencil or paper.

Social Values. This book provides also for the social aspects of arithmetic. It introduces the pupil to business situations which are to be met in the life of the ordinary adult. It provides information about gains and losses in business transactions. It explains the saving and investing of money and the resultant benefits. It gives the pupil a knowledge of discount, commission, taxation, insurance, and other pertinent subjects which are common to everyday life.

Teaching Procedures. A Teachers's Manual and Key accompany each book in the Series. The Manual suggests methods for teaching the fundamental operations studied in arithmetic. Sample lesson plans will assist the busy teacher in preparing each day's work. A Course of Study outlines the aims, objectives, and suggested requirements for each year's program.

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TABLE OF CONTENTS

Unit One: Working With Numbers

Lesson 1. Place Value of Numbers 3
Lesson 2. Reading and Writing Numbers 4
Lesson 3. Roman Numerals 5
Lesson 4. Adding by Endings 6
Lesson 5. Addition and Subtraction 7
Lesson 6. Addition 8
Lesson 7. Subtraction 9
Lesson 8. Zeros in Subtraction 11
More Zeros in Subtraction 12
Lesson 9. Using Big Numbers 13

Unit Two: Multiplication and Division

Multiplication Tables 16
Lesson 1. Multiplication 17
Lesson 2. Zeros in Multiplication 18
Lesson 3. Final Zeros in Multiplication 19
Lesson 4. Three-Place Multiplier 20
Lesson 5. Four-Place Multiplier 21
Lesson 6. More Zeros in Multiplication 22
Division Tables 24
Lesson 7. Short Division 25
Inexact Division Tables 26–27
Lesson 8. More Short Division 28
Lesson 9. Money in Short Division 29
Lesson 10. Long Division 30
Lesson 11. Long Division–Partial Dividend 31
Lesson 12. More Two-Place Quotients 32
Lesson 13. Two- and Three-Place Quotients 33
Lesson 14. Introducing Trial Quotient 34
Lesson 15. The Teens in Division 35
Lesson 16. Money in Long Division 36
Lesson 17. Three-Place Divisor 37
Lesson 18. Two-, Three-, and Four-Place Quotients 39

Unit Three: Introducing Fractions

Lesson 1. Halves and Fourths 45
Lesson 2. Fourths and Eighths 46
Lesson 3. Changing Fractions to Higher Terms 47
Lesson 4. Reducing Fractions to Lowest Terms 49
Lesson 5. Proper and Improper Fractions 50
Lesson 6. Mixed Numbers 51
Lesson 7. Changing Improper Fractions to Whole or Mixed Numbers 52
Lesson 8. Introducing Addition of Fractions 53
Lesson 9. Introducing Subtraction of Fractions 54
Lesson 10. Addition and Subtraction With Reduction 55
Lesson 11. Addition of Fractions 57
More Addition of Fractions 58
Lesson 12. Addition and Subtraction of Mixed Numbers (Like Denominators) 59
Adding and Subtracting Mixed Numbers 60
Lesson 13. Subtraction of Fractions 61
Lesson 14. Fractions With Related Denominators 62
Lesson 15. Mixed Numbers in Addition and Subtraction (Related Denominators) 63
Lesson 16. Expressing Mixed Numbers in Simpler Form 64
Lesson 17. Addition of Mixed Numbers With Carrying 65
Lesson 18. Addition of Mixed Numbers With Carrying and Reduction 66

Unit Four: More Work With Fractions

Lesson 1. Prime and Composite Numbers 70
Lesson 2. Multiples 71
Lesson 3. Finding the Least Common Multiple 72
Lesson 4. Adding Fractions With Unlike Denominators 73

TABLE OF CONTENTS (Continued)

More Addition With Unlike Denominators 74
Lesson 5. Introducing Borrowing With Fractions 75
Lesson 6. Preparing for Borrowing 76
Lesson 7. Borrowing With Like Denominators 77
Lesson 8. Borrowing With Related Denominators 78
Lesson 9. Borrowing With Unlike Denominators 79
Lesson 10. More Work With Fractions 80

Unit Five: Multiplication and Division of Fractions

Lesson 1. Multiplication of Fractions 86
Lesson 2. Multiplying a Fraction by a Whole Number 87
Lesson 3. Introducing Cancellation 88
Lesson 4. Multiplying a Fraction by a Fraction 89
Lesson 5. Multiplying When Mixed Numbers Are Involved 90
Lesson 6. Another Way of Multiplying Fractions 93
Lesson 7. Dividing a Whole Number by a Fraction 95
Lesson 8. Dividing a Whole Number by a Mixed Number 96
Lesson 9. Dividing a Fraction by a Whole Number and by a Fraction 97
Lesson 10. More Fractions in Division 98–99
Lesson 11. Fractions Express Division 101
Practice With Fractions 102

Unit Six: Two-Step Problems

Two-Step Problems 108
Practice With Problems 109–112
Two-Step Problems 113–115

Unit Seven: Measurements

Lesson 1. Finding Perimeters 120
Lesson 2. Changing Measures 121
Lesson 3. Finding the Perimeter of a Rectangle 122
Lesson 4. Finding the Perimeter of a Square 123
Lesson 5. Area 125
Lesson 6. Finding the Area of a Rectangle 126
Problems in Finding Area 127
Lesson 7. Using Fractional Dimensions 129

Unit Eight: Drawing to Scale

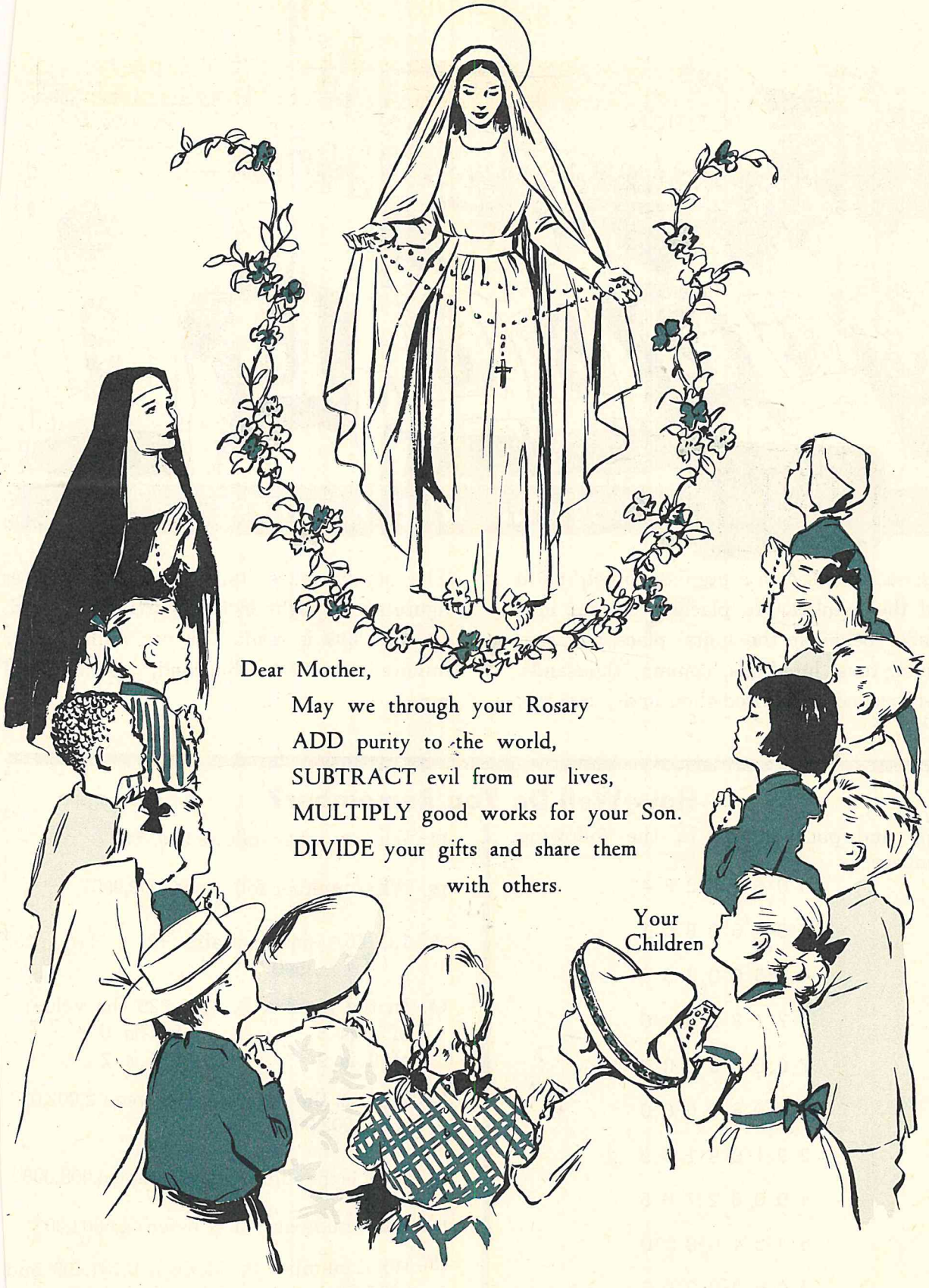
Lesson 1. Scale Drawings 132
Working With Scale Drawings 133
Lesson 2. The Bar Graph 134
Lesson 3. The Line Graph 135
Lesson 4. Measures 136
Review of Measures 137

Unit Nine: Enrichment Material

Part One: Work for Quick Thinkers
Lesson 1. Relationship in Problems 139-140
Lesson 2. When to Express a Remainder as a Fraction 141
Lesson 3. Estimating Answers 142
Lesson 4. Learning About Decimals 143
Lesson 5. Adding and Subtracting Decimals 144
Lesson 6. Bills 145
Tables of Measure 146
Part Two: Tests 147–162

Unit Ten: Drill and Mental

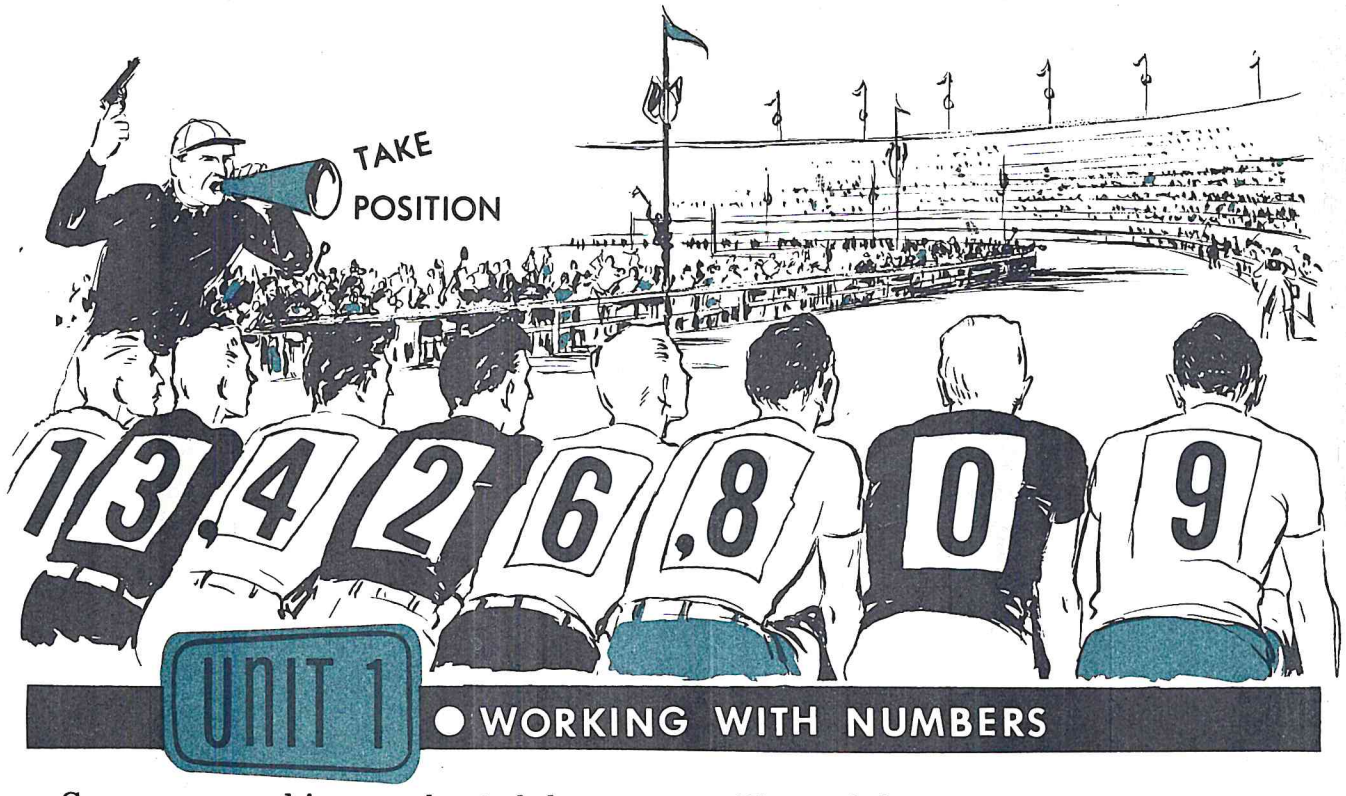
Daily Progress Drills 163–187



Dear Mother,

May we through your Rosary
ADD purity to the world,
SUBTRACT evil from our lives,
MULTIPLY good works for your Son.
DIVIDE your gifts and share them
with others.

Your
Children



UNIT 1 ● WORKING WITH NUMBERS

Commas are used in a number to help us to read the number. In placing commas in a number begin at the units' place and say, "Units, tens, hundreds, comma; thousands, ten-thousands, hundred-thousands, comma; etc."

The period takes its name from the first figure at the right in that particular period. **13, 426, 809** is read: Thirteen million, four hundred twenty-six thousand, eight hundred nine.

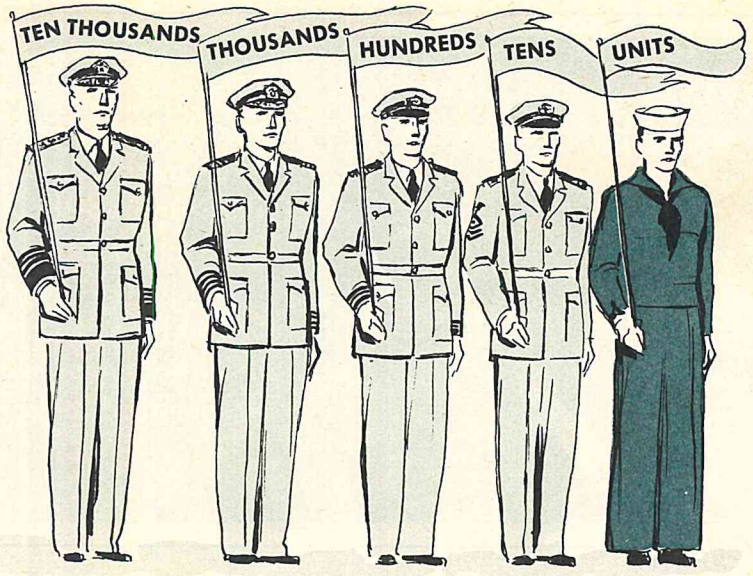
How Well Do You Remember?

Copy and put commas in the following numbers:

1. 5 0 6 2 7 2 0 4
2. 8 3 4 6 0 8 9 1
3. 4 8 6 0 0 3 5 0
4. 9 7 1 8 2 0 4 0
5. 7 0 0 0 0 0 0 6
6. 6 1 0 6 0 0 6 0
7. 2 9 1 0 9 1 0 9
8. 4 0 0 6 2 7 0 5
9. 5 4 5 4 0 8 2 0
10. 9 0 6 0 2 0 0 9

11. What number follows 999,999?
12. What number follows 99,999,999?
13. 13, 467, 540 contains 13 (?), 467 (?), 540 (?).
14. In the number 3, 465, 729 the value: of 3 is 3 (?), of 5 is 5 (?), of 9 is 9 (?), of 7 is 7 (?).
15. What is the difference between 2,002,020 and 2,002,002?
16. What is the sum of 6,340,290 and 8,008,008?
17. What number comes before 4,000,000?
18. What number is between 6,731,499 and 6,731,501?

4



4 4, 4 4 4

LESSON 1. Place Value of Numbers

We see in the number above, that each **4** has a different value, and that this value depends upon the place the figure holds in a number. Each **4** is **10** times the value of the **4** to the right of it.

The value of a figure depends upon the place it holds in a number.

1. In the number 888,888 the value of the 8 in tens' place is ....(?).... times the value of the 8 in units' place.

2. The value of 8 in thousands' place is (?) times the value of 8 in tens' place.

3. The value of 8 in hundred-thousands' place is ....(?).... times the value of 8 in hundreds' place.

4. The value of 8 in ten-thousands' place is ....(?).... times the value of 8 in thousands' place.

5. The value of 8 in hundreds' place is (?) times the 8 in units' place.

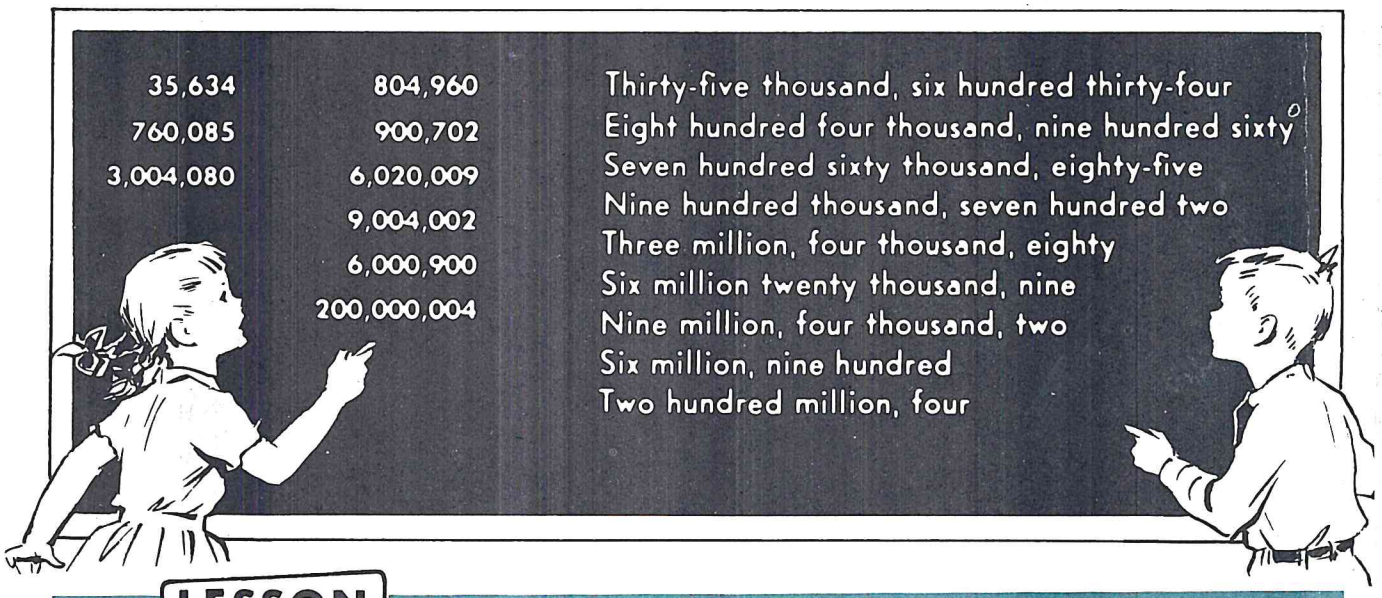
6. Give the value of each 2 in the number 2,482,024.

7. In the number 5,346,829 what is the value of each number?
   5 means 5,000,000
   3 means 300,000
   4 means ....(?)....
   6 means ....(?)....
   8 means ....(?)....
   2 means ....(?)....
   9 means ....(?)....

8. In the number 6,025,070, there are ....(?).... millions, ...(?).... hundreds, ...(?).... ten-thousands ....(?).... thousands, ...(?).... units, ...(?).... hundred-thousands, ...(?).... tens.

9. In the number 9,320,418 there are 9 ....(?).... 320 ....(?).... 418 ....(?)....

10. Give the value of each 5 in the number 540,156,305.



LESSON 2. Reading and Writing Numbers

Read the following figures orally:

1.	8,364,750	16,024,425	600,604,090
2.	4,902,060	15,428,360	400,060,300
3.	7,390,478	90,400,000	960,500,002
4.	3,060,060	32,010,001	202,020,700
5.	6,004,005	63,400,008	260,080,090

Write the following in figures:

1. Two hundred five thousand, fifty.
2. Six hundred thousand, four hundred one.
3. Eight hundred six thousand, ninety-one.
4. Nine million, nine thousand, two hundred.
5. Eighty million, six hundred thousand, five.
6. Sixty million, seven hundred eight thousand, four hundred nineteen.
7. Seven hundred four million, three hundred six thousand, five hundred ninety-one.
8. Eight hundred million, eight thousand, twenty-one.
9. Nine hundred six million, seven hundred nine thousand, four hundred fifty.
10. One hundred six million, eighty thousand, six.

Write the answers to the following questions.

1. What number is 10 more than 67,456?
2. What number is 100 less than 40,587?
3. What number is 1000 more than 35,809?
4. What number comes after 999,999?
5. What number comes before 689,000?
6. How much more than 506,987 is 606,987?
7. What number is 1000 more than 5,000?
8. What number is 10 more than 400,000?
9. What number comes after 909,999?
10. What number comes before 9000?
11. 100,000 is how many more than 99,999?
12. Add 1,000 to 99,000.
13. Add 10,000 to 999,000.
14. From 100,000 take 1,000.
15. Write in figures: Five million, five thousand, five.

1	2	3	4	5	6	7	8	9	10
I	II	III	IV	V	VI	VII	VIII	IX	X
5	10	15	20	25	30	35	40	45	50
V	X	XV	XX	XXV	XXX	XXXV	XL	XLV	L
10	20	30	40	50	60	70	80	90	100
X	XX	XXX	XL	L	LX	LXX	LXXX	XC	C
100	200	300	400	500	600	700	800	900	1000
C	CC	CCC	CD	D	DC	DCC	DCCC	CM	M

LESSON 3. Roman Numerals

In the Roman System of notation when a letter is repeated, its value is repeated. Letters are not used more than **3** times, as

X = **10** XXX = **30** C = **100** CCC = **300**

When a letter of less value is written after a letter of greater value, add the lesser to the greater: XV = **15** LX = **60** DC = **600** DCCC = **800**

When a letter of less value is written before a letter of greater value, subtract the lesser from the greater: XL = **40** XC = **90** CD = **400** CM = **900**

Study the following important dates. First they are written in Arabic, as we usually see them. Then they are written in Roman numerals.

288	St. Sebastian was martyred for the Faith.	CCLXXXVIII
304	St. Agnes died a martyr's death.	CCCIV
1492	Columbus discovered America.	MCDXCII
1776	The Declaration of Independence was signed.	MDCCLXXVI
1917	Our Lady appeared at Fatima.	MCMXVII
1950	Many Pilgrimages were made to Rome.	MCML

Matching Test

1. 1951 (?) DXX
2. 1840 (?) CDLXX
3. 1740 (?) MDCCLXXX
4. 1635 (?) MDCCCXL
5. 470 (?) MDCCXL
6. 520 (?) MDCXXXV
7. 1780 (?) MCMLI

Write in Arabic numbers.

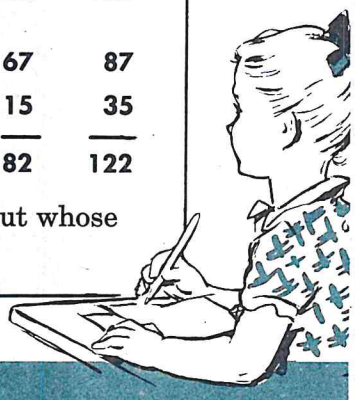
1. XXV	8 XXXI	15 LXXIII
2. XC	9 XLIX	16 CLXXX
3. CXL	10 LVII	17 CDIII
4. CC	11 CCCL	18 DCCLXV
5. DCX	12 DCCC	19 DCCCXII
6. CM	13 CMVI	20 MCMLX
7. M	14 MD	21 MCX

Write in Roman numerals.

1. 100	8 485	15 800
2. 125	9 500	16 856
3. 200	10 593	17 900
4. 250	11 600	18 939
5. 300	12 624	19 1000
6. 367	13 700	20 1543
7. 400	14 748	21 1955

8	18	28	38	48	4	14	24	54	44
8	8	8	8	8	9	19	39	29	59
16	26	36	46	56	13	33	63	83	103
9	19	29	39	49	7	17	47	67	87
5	15	15	15	15	5	25	55	15	35
14	34	44	54	64	12	42	102	82	122

Note the numbers whose unit endings are alike but whose tens are different.



LESSON 4. Review of Basic Facts in Addition

Add:

1.	9	19	29	39	47	**11.**	8	18	128	2348
	8	8	8	8	8		9	29	49	359
2.	8	18	28	35	48	**12.**	7	27	137	3457
	7	7	7	7	7		8	38	48	8
3.	6	16	28	36	46	**13.**	5	35	145	2135
	5	5	5	5	5		6	46	6	456
4.	9	19	25	39	49	**14.**	7	17	247	4027
	7	7	7	7	7		9	29	59	39
5.	8	18	28	39	47	**15.**	6	36	146	3126
	6	6	6	6	6		8	8	98	238
6.	9	19	29	39	48	**16.**	9	49	139	5139
	9	19	19	19	19		9	39	259	29
7.	7	17	27	36	47	**17.**	6	56	306	4056
	6	16	16	16	16		7	27	37	107
8.	9	19	29	38	49	**18.**	3	63	503	6203
	3	13	23	33	53		9	9	109	79
9.	9	19	28	49	59	**19.**	6	86	726	8546
	6	16	36	46	26		9	29	59	1019
10.	5	15	25	46	55	**20.**	8	98	898	6438
	8	18	38	28	48		5	5	35	145

LESSON 5. Addition and Subtraction

56,783 68,279 125,062	Think:	Write:
Use the grown-up way of adding.	9,12 →	2 under 9 and carry the 1
	1, 8, 16 →	6 under 7 and carry the 1
	1, 3, 10 →	0 under 2 and carry the 1
	1, 9, 15 →	5 under 8 and carry the 1
	1, 7, 12 →	2 under 6 and 1 in the next place to the left.

371,423 −156,349 215,074	Think:	Write:
Use the grown-up way of subtracting.	9 from 13, 4 →	4 under 9
	4 from 11, 7 →	7 under 4
	3 from 3, 0 →	0 under 3
	6 from 11, 5 →	5 under 6
	5 from 6, 1 →	1 under 5
	1 from 3, 2 →	2 under 1

Add:

1.	8,539 4,678	7,648 5,487	9,536 4,696
2.	7,835 7,489	8,765 8,765	6,842 9,679
3.	$85.97 63.45	$67.58 49.79	$93.78 39.98
4.	$47.65 78.98	$58.75 95.69	$96.29 58.96
5.	$95.84 69.79	$98.76 76.69	$59.38 68.94

Arrange in columns and add. Be sure to put decimal point under decimal point.

1. 45 + 56 + 73 + 89 + 95 + 24 + 36
2. 93 + 83 + 25 + 46 + 57 + 73 + 69
3. $4.46 + .85 + .90 + 1.07 + .64 + .08
4. $5.50 + .75 + .04 + .73 + 6.49 + .38
5. $6.00 + .80 + .45 + 2.50 + .75 + 1.89

Add:

1.	2.	3.	4.
47	92	175	225
53	54	83	64
85	63	50	19
29	75	67	473
36	64	85	90
92	86	29	34
77	85	64	75

Subtract:

1.	975,432 296,689	987,654 398,896
2.	876,543 697,867	765,432 589,975
3.	$6,754.32 4,987.65	$5,432.18 2,875.49
4.	$4,321.56 2,689.89	$7,534.67 3,654.78
5.	$8,653.46 4,986.88	$9,876.45 5,987.98

Find the difference between the following numbers. Remember the dollar signs and decimal points.

1. $4,725.24 and $2,458.50
2. $6,850.75 and $3,975.29
3. $2,903.60 and $1,487.96
4. $5,823.24 and $5,176.35
5. $8,756.87 and $4,520.88

Add:

1.	2.	3.
$1.35	$3.59	$4.00
.48	.63	.75
3.70	4.08	.24
.90	.80	.90
1.65	2.75	6.50
.81	.42	.38
.94	.96	1.08

205,109	1,001,600	3,004,540
80,060	3,004,230	103,702
7,005	680,020	72,600
100	4,206,005	4,060
103	4,060	320
292,377	8,895,915	3,185,222

Note: In column addition, figures must be directly under one another.

LESSON 6. Addition

Add:

1.	508,209	603,408	**5.**	8,003,630	9,008,420
	40,050	50,040		208,304	305,406
	8,009	9,006		81,500	91,600
	200	400		6,090	3,060
	405	804		460	240
2.	603,407	705,609	**6.**	6,005,840	7,006,350
	30,070	30,060		406,201	508,403
	9,003	7,003		42,400	65,600
	500	800		7,080	8,050
	608	906		620	830
3.	904,503	807,304	**7.**	5,003,920	4,002,330
	60,080	80,033		308,402	604,208
	8,002	4,008		52,600	63,700
	900	700		6,050	8,060
	207	509		760	470
4.	2,003,800	5,004,700	**8.**	7,008,500	305,208
	3,004,460	8,008,320		4,009,340	60,080
	320,030	460,050		840,060	6,004
	5,304,006	3,028,009		5,304,003	800
	6,813	7,415		7,080	603

Arrange in columns and add.

1. 3,005,600 + 204,320 + 80,050 + 2,600
2. 603,508 + 20,080 + 6,004 + 308
3. 5,001,105 + 20,405,300 + 4,000
4. 9,004,630 + 408,301 + 73,500 + 84
5. 6,003,760 + 509,403 + 62,400 + 170
6. 12,000 + 250 + 4,603 + 196 + 504

LESSON 7. Subtraction

	Think:	Write:
602	8 from 12, 4 → 4 under 8	
−278	7 from 9, 2 → 2 under 7	
324	2 from 5, 3 → 3 under 2	

	Think:	Write:
700	7 from 10, 3 → 3 under 3	
−347	4 from 9, 5 → 5 under 4	
353	3 from 6, 3 → 3 under 3	

Subtract:

1.	783	962	541	733
	−295	−387	−185	−496
	488	575	356	237
2.	847	653	925	873
	−479	−387	−296	−486
3.	300	500	700	900
	−158	−267	−384	−478
4.	400	600	800	700
	−169	−385	−423	−196
5.	804	906	705	603
	−385	−589	−637	−248
6.	503	407	308	902
	−284	−188	−159	−768

Subtract:

1.	$2.15	$3.18	$4.12	$5.14
	−1.96	−2.89	−3.75	−4.68
2.	$6.25	$7.43	$8.36	$9.58
	−3.78	−2.95	−4.77	−8.79
3.	$9.03	$8.02	$7.01	$4.08
	−3.29	−4.78	−5.63	−1.89
4.	$6.02	$5.07	$4.08	$9.04
	−5.83	−4.78	−3.89	−8.68
5.	$8.00	$7.00	$6.00	$5.00
	−2.48	−3.59	−4.67	−1.78
6.	$4.00	$9.00	$7.00	$3.00
	−1.76	−8.84	−3.53	−1.69

Watch closely! Do you borrow once or twice?

1.	605	847	759	905
	−183	−296	−183	−461
	422	551	576	444
2.	923	470	630	584
	−719	−228	−129	−256
3.	750	803	650	923
	−295	−146	−387	−267

Sometimes you borrow; sometimes you do not.

1.	$3.64	$5.89	$6.73	$9.65
	−2.83	−4.95	−5.80	−8.70
2.	$8.55	$7.63	$4.84	$6.50
	−1.28	−6.05	−3.09	−2.25
3.	$5.03	$6.08	$7.05	$8.06
	−1.72	−2.69	−3.58	−4.92

Practice With Problems

Solve:

1. The distance from New York to Buenos Aires by air is 5,295 miles. From New York to Santiago it is 5,425 miles. How much farther away is Santiago?

2. In traveling from San Francisco to Australia, a distance of 7,517 miles is covered. If Mr. Fee has flown 3,785 of these miles, how far has he yet to travel?

3. Mary is leaving New York for Rome which is a distance of 5,056 miles. Margaret is going to England. This is 3,500 miles. How much longer than Margaret's trip is Mary's?

4. Lisbon is 4,100 air miles from New York. Berlin is 4,026 air miles from New York. Berlin is nearer to New York by how many miles?

5. Miss Jacovina traveled 3,600 miles by air from New York to Paris. Miss Noone traveled 3,650 miles from New York to Peru. How many miles did they both cover?

6. From San Francisco to Sydney is 7,517 air miles. How many miles does a pilot fly if he makes a trip there and back?

7. Mrs. Murray's airplane trip from New York to Rome was 5,056 miles. Mrs. Drumm's trip to Lisbon was 4,100 miles and Mr. Bonner's trip to Dublin was 3,182 miles. How many miles were covered by the three travelers?

8. The Sisters of the Immaculate Heart are going by plane from New York to Chile. This is 5,425 miles. When they reach Peru 3,650 miles of the trip will have been completed. How many more miles must they travel before arriving at their destination?

9. From New York to Madrid the airline distance is 3,802 miles. From San Francisco to Hawaii it is 2,407 miles. What is the difference in miles between the two trips?

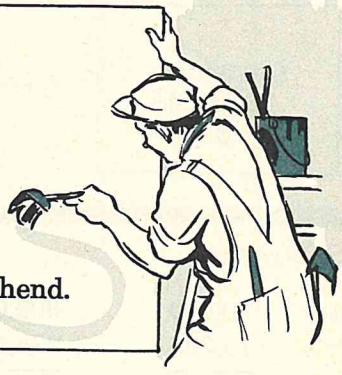
10. From Tokyo to San Francisco the distance is 5,250 air miles. If Mr. Dinger travels there and back, how many miles has he covered?

LESSON 8. Zeros in Subtraction

$$\begin{array}{r} 60405 \\ -\,13060 \\ \hline 47345 \end{array}$$

Think:	Write:
0 from 5, 5 →	5 under 0
6 from 10, 4 →	4 under 6
0 from 3, 3 →	3 under 0
3 from 10, 7 →	7 under 3
1 from 5, 4 →	4 under 1

Watch the zeros in the minuend and in the subtrahend.



Subtract and check:

1.	8003	7005	6004	9002
	508	609	405	603
2.	9000	6000	3000	5000
	500	300	200	400
3.	8050	7030	6030	5060
	508	309	407	206
4.	5000	3000	8000	6000
	208	107	406	505
5.	7008	8000	8050	9000
	209	500	504	407
6.	$50.06	$70.00	$40.30	$60.00
	2.07	5.00	1.08	4.04
7.	$80.00	$50.60	$70.60	$30.06
	2.07	2.03	6.08	1.09
8.	$40.00	$20.10	$30.00	$50.06
	2.06	5.08	6.00	3.08

Solve:

1. From $50.00 take $2.09
2. From $70.80 take $4.07
3. From $60.03 take $3.08
4. From $80.05 take $5.06
5. From $90.00 take $8.00

Subtract and check:

1.	$803.06	$902.03	$506.05
	40.80	20.90	50.60
2.	$402.01	$606.09	$308.07
	20.40	40.80	03.60
3.	$300.02	$800.05	$700.03
	20.05	40.09	50.08
4.	$700.04	$900.07	$400.06
	70.08	60.09	30.07
5.	$800.00	$600.00	$400.00
	42.68	51.35	63.89
6.	$900.00	$700.00	$500.00
	46.38	29.75	38.64
7.	$903.04	$800.02	$700.00
	40.80	30.08	52.89
8.	$800.00	$600.04	$804.05
	79.85	50.06	60.10

Solve:

1. Take $69.25 from $700.00
2. Take $40.00 from $800.09
3. Take $20.50 from $504.07
4. Take $50.09 from $900.00
5. Take $30.80 from $600.05

More Zeros in Subtraction

$40,000.00
23,965.46
16,034.54

Think:
- 6 from 10, 4
- 4 from 9, 5
- 5 from 9, 4
- 6 from 9, 3
- 9 from 9, 0
- 3 from 9, 6
- 2 from 3, 1

Write:
- 4 under 6
- 5 under 4
- 4 under 5
- 3 under 6
- 0 under 9
- 6 under 3
- 1 under 2

Be careful borrowing with **4**, **5**, and **6** zeros in the minuend.

Subtract:

1.	20,000 15,284	800,000 235,463	2,000,000 366,728
2.	30,000 24,357	900,000 366,279	4,000,000 279,634
3.	40,000 36,173	600,000 482,165	6,000,000 173,825
4.	60,000 43,168	700,000 174,159	8,000,000 761,642
5.	800,000 264,527	400,000 361,248	200,000 198,357
6.	300,000 183,762	200,000 165,274	500,000 463,184
7.	5,000,000 463,175	7,000,000 672,154	8,000,000 581,463
8.	9,000,000 381,264	6,000,000 832,479	4,000,000 783,264

Subtract:

1.	$800.00 165.59	$900.00 176.24	$600.00 284.35
2.	$500.00 248.73	$400.00 356.84	$300.00 182.95
3.	$600.00 279.56	$200.00 163.42	$100.00 62.84
4.	$9000.00 1354.35	$7000.00 4621.38	$4000.00 1843.69
5.	$8000.00 2634.64	$5000.00 3841.51	$6000.00 4137.86
6.	$20,000.00 2,656.48	$60,000.00 4,753.97	$70,000.00 3,584.25
7.	$40,000.00 6,829.56	$50,000.00 12,674.35	$80,000.00 26,431.83
8.	$30,000.00 1,564.29	$10,000.00 3,428.31	$90,000.00 4,682.56

How much more is:

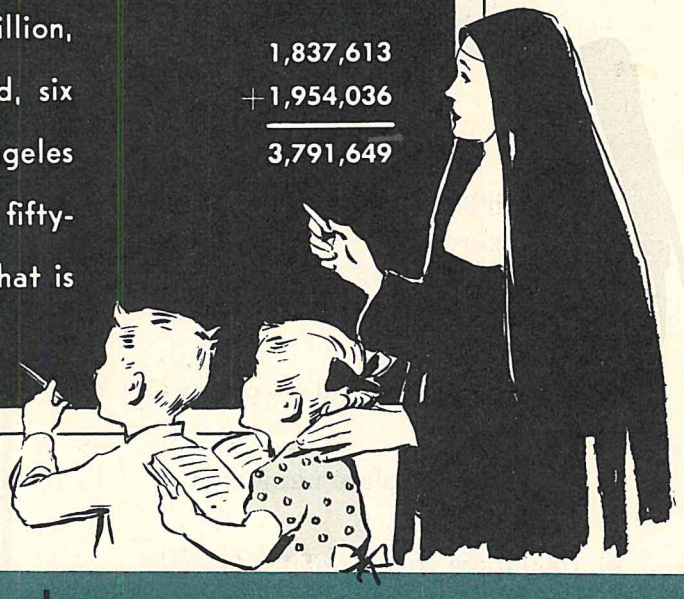
1. 40,000 than 28,365
2. 50,000 than 17,673
3. 800,000 than 35,796
4. 2,000,000 than 1,987,654
5. 4,000,000 than 3,654,320

What is the difference between:

1. $900.00 and $456.75
2. $700.00 and $683.89
3. $5000.00 and $2,654.50
4. $4000.00 and $3,790.65
5. $60,000.00 and $59,673.43

In Detroit there are about one million, eight hundred thirty-seven thousand, six hundred thirteen people. In Los Angeles there are one million, nine hundred fifty-four thousand, thirty-six people. What is the population of both cities?

$$\begin{array}{r} 1{,}837{,}613 \\ +\,1{,}954{,}036 \\ \hline 3{,}791{,}649 \end{array}$$



LESSON 9. Using Big Numbers

Solve:

1. There are now 7,841,610 people residing in the city of New York. In Chicago there are 3,631,835 people. How many more people are in New York than in Chicago?

2. In the city of Philadelphia there are 2,057,210 residents. In Los Angeles there are 103,174 fewer than this. How many people live in Los Angeles?

3. The population of the city of Detroit is 1,837,613. The population of Chicago is 3,631,835. How many fewer people live in Detroit than in Chicago?

4. There are 116,423 more people in Los Angeles than in Detroit. If there are 1,837,613 in Detroit, what is the population of Los Angeles?

5. The state of Pennsylvania has a population of 10,436,965. If 2,057,210 of these residents live in Philadelphia, how many are in the other parts of Pennsylvania?

6. If Los Angeles has a population of 1,954,036 and Philadelphia has a population of 2,057,210 how many people are there in both cities?

7. Find the total population of the following large cities:

New York	7,841,610
Chicago	3,631,835
Philadelphia	2,057,210

8. The total population of New York and Chicago is 11,473,445. If 7,841,610 of this number are residents of New York, what is the population of the city of Chicago?

9. The area of the state of California is about 155,980 square miles. This is 106,310 square miles less than the state of Texas. What is the area of Texas?

10. The area of the Dakotas is 2,290 square miles more than the area of Montana which is about 145,310 square miles. What is the area of the Dakotas?

UNIT 1 Test

Part I

1. We call 6,430,175 a (?) place number. The figure (?) tells the number of millions; 0 shows there are no (?); 7 tells the number of (?).
2. The number that follows 99,999 is (?).
3. The largest 5-place number is (?).
4. 1000 more than 82,460 is (?).
5. 1000 less than 90,000 is (?).
6. Give the value of each digit in the number 6,421,385.
7. Write in figures: three million, four hundred thousand, three.
8. Write in figures: four hundred million, eight thousand, three hundred.
9. Write in figures: thirty dollars and four cents.
10. Write in figures: one thousand sixteen dollars and fifteen cents.

Part II

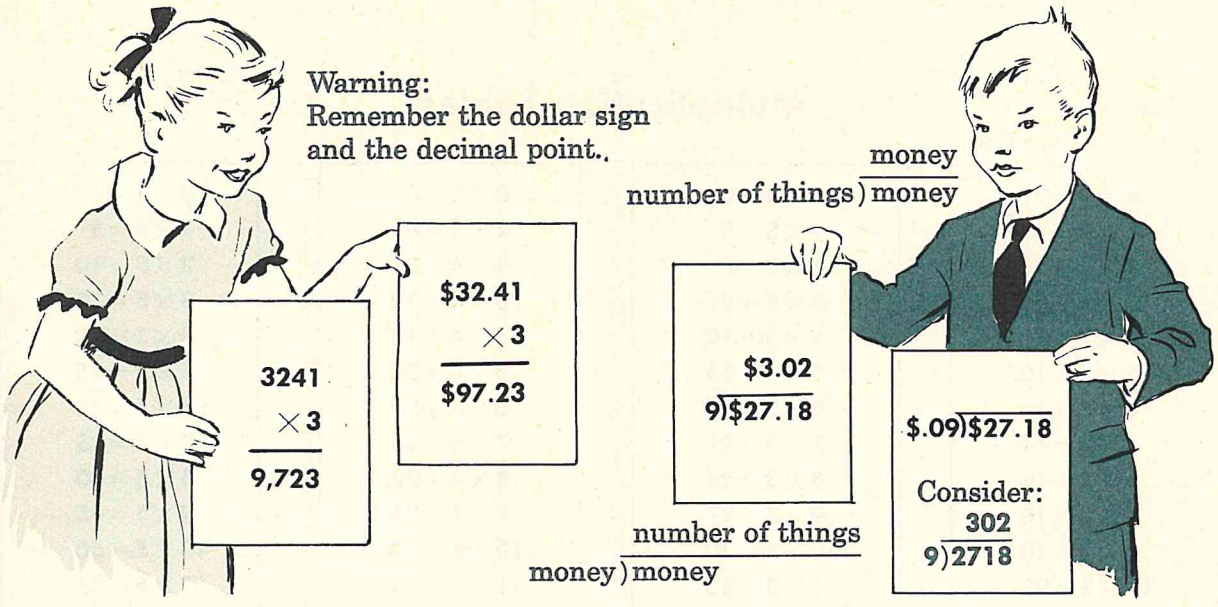
1.	34,216 −18,109	$342.16 −181.09
2.	63,000 −21,637	$630.00 −216.37

3. Arrange in a column and add: 940,612; 245,820; 2,045; 6,900; 340; 837,402.
4. Arrange in a column and add: $120.96; $634.08; $30.64; $91.30; $891.57.
5. From 600 take 127.
6. From 9000 take 359.
7. From 7000 take 1807.
8. From $60.03 take $19.84.
9. How much less than $459 is $89.45?
10. How much more than $75.39 is $180?

Part III

Match Column B with Column A:

A	B
1. (?) hundreds	a. 7-place figure
2. (?) ten-thousands	b. 9-place figure
3. (?) millions	c. cents
4. (?) hundred-thousands	d. 3-place figure
5. (?) tens	e. subtraction
6. (?) thousands	f. 5-place figure
7. (?) hundred-millions	g. addition
8. (?) 2 decimal places	h. 2-place figure
9. (?) remainder	i. 6-place figure
10. (?) sum	j. 4-place figure



UNIT 2 • MULTIPLICATION AND DIVISION

How Well Do You Remember?

Fill in the blanks:

A.

$$\begin{array}{r} 4364 \\ \times 70 \\ \hline 305{,}480 \end{array}$$

B.

$$\begin{array}{r} \$43.64 \\ \times 70 \\ \hline \$3{,}054.80 \end{array}$$

1. In A, the multiplier is (?), the product is (?), and the multiplicand is (?).
2. In A, the answer is read 305 (?) 480.
3. In B, the answer is read 3 (?) 54 dollars and 80 (?).
4. In B, the decimal point in the product separates the (?) from the cents. The comma is used between 0 and 3 to show how many (?) dollars are in the answer.
5. The answer in multiplication is called the (?).

Fill in the blanks:

1. In A, the divisor is (?). In B, the divisor is (?).
2. In A, the quotient is (?). The decimal point in the quotient separates the (?) and (?). The answer is read (?) and (?) cents.

A.

$$8\overline{)\$39.20}\quad \$4.90$$

B.

$$\$.08\overline{)\$39.20}\quad 490$$

3. In B, the quotient is (?).
4. There is no decimal point in the quotient in B because there are (?) dollars and (?). The answer is read (?) (?) (?).
5. When the divisor and the dividend both represent money, the quotient represents a (?) of things.
6. When the dividend and the quotient both represent money, the divisor represents a (?) of things.
7. In A, the decimal point in the quotient is directly above the decimal point in the (?).
8. In B, the divisor and the dividend are both money, so the (?) cannot represent money.

Multiplication Tables

0×2=0
1×2=2
2×2=4
3×2=6
4×2=8
5×2=10
6×2=12
7×2=14
8×2=16
9×2=18
10×2=20
11×2=22
12×2=24

0×3=0
1×3=3
2×3=6
3×3=9
4×3=12
5×3=15
6×3=18
7×3=21
8×3=24
9×3=27
10×3=30
11×3=33
12×3=36

0×4=0
1×4=4
2×4=8
3×4=12
4×4=16
5×4=20
6×4=24
7×4=28
8×4=32
9×4=36
10×4=40
11×4=44
12×4=48

0×5=0
1×5=5
2×5=10
3×5=15
4×5=20
5×5=25
6×5=30
7×5=35
8×5=40
9×5=45
10×5=50
11×5=55
12×5=60

0×6=0
1×6=6
2×6=12
3×6=18
4×6=24
5×6=30
6×6=36
7×6=42
8×6=48
9×6=54
10×6=60
11×6=66
12×6=72

0×7=0
1×7=7
2×7=14
3×7=21
4×7=~~48~~ 28
5×7=35
6×7=42
7×7=49
8×7=56
9×7=63
10×7=70
11×7=77
12×7=84

0×8=0
1×8=8
2×8=16
3×8=24
4×8=32
5×8=40
6×8=48
7×8=56
8×8=64
9×8=72
10×8=80
11×8=88
12×8=96

0×9=0
1×9=9
2×9=18
3×9=27
4×9=36
5×9=45
6×9=54
7×9=63
8×9=72
9×9=81
10×9=90
11×9=99
12×9=108

Are You Sure of These?

×	4	8	12	0	3	9	1	5	11	2	6	10	7
2													

×	12	2	10	4	8	1	5	7	3	6	11	0	9
3													

×	1	3	5	7	12	2	10	4	9	0	11	6	8
4													

×	10	8	6	12	1	9	3	7	11	4	5	0	2
5													

×	2	4	6	8	10	1	3	5	7	9	0	11	12
6													

×	7	3	9	5	2	12	10	4	0	6	1	11	8
7													

×	11	3	9	5	12	2	10	4	1	7	0	6	8
8													

×	0	12	1	11	2	10	3	9	4	8	5	7	6
9													

375	609	900	$ .80	$1.30
×5	×8	×9	×5	×6
1875	4872	8100	$4.00	$7.80

Remember: Any number times zero equals zero. Watch the dollar sign and the decimal point.

LESSON 1. Multiplication

1.	463 ×9	582 ×7	629 ×6	456 ×8
2.	570 ×6	480 ×8	620 ×5	830 ×9
3.	503 ×8	604 ×9	708 ×4	905 ×7
4.	900 ×8	700 ×7	500 ×6	800 ×9
5.	875 ×4	890 ×6	608 ×7	400 ×8
6.	$.90 ×7	$.60 ×8	$.40 ×9	$.80 ×6
7.	$4.28 ×6	$5.76 ×9	$8.75 ×7	$5.63 ×8
8.	$7.09 ×6	$9.07 ×8	$8.04 ×9	$6.05 ×7
9.	$9.00 ×5	$7.00 ×7	$6.00 ×9	$8.00 ×6
10.	$7.50 ×8	$9.70 ×4	$5.30 ×5	$3.10 ×9
11.	$8.36 ×7	$9.05 ×9	$7.00 ×6	$4.70 ×8
12.	$9.28 ×5	$6.08 ×7	$8.00 ×9	$5.80 ×6

Solve:

1. Each desk in our class room cost $6.75. How much must be paid for 9 new ones?
2. Mr. Curran earns $508 a month. How much does he earn in 6 months?
3. An airplane can travel 250 miles an hour. How far can it travel in 7 hours?
4. The fifth grade prepared 8 baskets for the poor. If each basket cost them $8.50, how much money did they spend?
5. Each shelf in the De Sales library holds 278 books. How many books can be put on 9 shelves?
6. In a small country church about 300 people attend Sunday Mass. In a large city church 8 times this number are present. About how many people attend Mass in the large church?
7. Felt emblems may be bought at $.60 each. How much must be paid for 8 of them?
8. Gold filled athletic football charms cost $2.50 each. Find the cost of 9 charms.
9. Gift packages of fine chocolates cost $1.50 each. What is the cost of 7 boxes?
10. Assorted charms may be bought for $.95 per box. How much will 6 boxes cost?

Any number times zero is zero.	$6.20 × 45 = 31 00 + 248 0 = $279.00	$8.07 × 63 = 24 21 + 484 2 = $508.41	$9.00 × 78 = 72 00 + 630 0 = $702.00

LESSON 2. Zeros in Multiplication

Multiply:

1.	760 × 84 =	980 × 75 =	840 × 63 =	590 × 57 =
2.	420 × 98 =	650 × 83 =	950 × 49 =	870 × 38 =
3.	906 × 73 =	807 × 96 =	709 × 54 =	506 × 85 =
4.	604 × 69 =	509 × 58 =	608 × 73 =	407 × 95 =
5.	800 × 65 =	600 × 84 =	400 × 93 =	700 × 76 =
6.	900 × 76 =	500 × 89 =	300 × 65 =	800 × 98 =
7.	850 × 84 =	905 × 93 =	800 × 72 =	730 × 65 =
8.	500 × 96 =	803 × 89 =	740 × 58 =	608 × 76 =

Solve:

1. What will Mrs. Stone pay for 12 lb. of butter at $.80 per lb.?
2. Joanne's father had an orchard of 50 rows of trees with 25 trees in each row. How many trees were in the orchard?
3. During a certain period the Manley store sold 75 dresses at $8.05 each. How much was received for the dresses?

Multiply:

1.	$9.03 × 46 =	$7.04 × 64 =	$6.03 × 58 =	$8.05 × 85 =
2.	$6.09 × 95 =	$7.08 × 59 =	$5.04 × 89 =	$9.08 × 98 =
3.	$8.40 × 87 =	$9.50 × 78 =	$7.30 × 69 =	$6.70 × 96 =
4.	$5.90 × 57 =	$8.40 × 75 =	$9.80 × 64 =	$7.60 × 46 =
5.	$8.00 × 84 =	$7.00 × 48 =	$6.00 × 96 =	$5.00 × 57 =
6.	$9.00 × 87 =	$4.00 × 78 =	$3.00 × 69 =	$8.00 × 96 =
7.	$9.06 × 45 =	$8.40 × 54 =	$7.00 × 68 =	$6.05 × 89 =
8.	$6.00 × 95 =	$7.20 × 89 =	$6.08 × 54 =	$8.00 × 45 =

Solve:

1. Books about the early martyrs cost $1.20 each. How much will 25 books cost?
2. During the summer the Luff family spent $7.50 a day for food. How much was their bill for the month of July? (31 days)
3. How much will a grocer receive for 207 oranges which he sells at $.05 each?

LESSON 3. Final Zeros in Multiplication

Zero times any number is zero. Observe the placement of figures in the products.

742
X 80
59360

0 times **742** is **0**. Write **0** in the product under the **0** in the multiplier.
8 times **742** is **5936**. Write **5936** in the product so that **6** is under the **8** in the multiplier.

Multiply:

1.	987	876	765	489
	40	60	80	90
2.	686	748	857	975
	60	70	80	90
3.	486	847	943	758
	600	800	500	900
4.	653	594	498	968
	700	400	300	800
5.	690	850	740	870
	900	700	500	300
6.	940	590	480	760
	800	600	400	900
7.	908	807	706	605
	300	400	500	600
8.	504	403	302	806
	700	800	900	500
9.	200	300	400	500
	900	800	700	600
10.	600	700	800	900
	400	500	900	800

Multiply:

1.	\$9.80	\$8.70	\$7.60	\$6.50
	800	700	600	500
2.	\$5.40	\$4.30	\$3.20	\$8.90
	900	300	600	800
3.	\$6.59	\$8.68	\$7.45	\$9.74
	70	80	40	50
4.	\$5.73	\$9.28	\$4.87	\$3.56
	60	90	30	70
5.	\$9.85	\$8.73	\$7.64	\$5.29
	400	600	500	700
6.	\$5.96	\$6.47	\$4.90	\$3.57
	800	900	300	600
7.	\$3.05	\$4.06	\$5.07	\$6.08
	900	800	200	300
8.	\$8.04	\$9.03	\$7.02	\$9.05
	700	600	500	400
9.	\$8.00	\$9.00	\$6.00	\$7.00
	600	500	400	300
10.	\$5.00	\$4.00	\$9.00	\$6.00
	900	800	600	700

609 X720 12180 4263 438480	**0** times **609** is **0**. Write **0** in the product under the **0** in the multiplier. **2** times **609** is **1218**. Write **1218** to complete the first partial product. Be sure that **1218** is written so that **8** is directly under the **2** in the multiplier.	**7** times **609** is **4263**. Write **4263** as the second partial product. Be sure that **4263** is written so that **3** is in the same column as the **7** in the multiplier. Add the partial products.

LESSON 4. Three-Place Multiplier

Multiply:

1.	246 357	468 285	987 645	876 538
2.	567 275	678 386	789 497	954 583
3.	209 630	308 750	407 820	506 940
4.	608 240	709 360	805 470	903 580
5.	900 807	800 605	700 704	600 603
6.	500 902	400 403	300 804	200 607
7.	703 307	804 408	906 609	504 405
8.	409 904	308 803	209 709	506 805
9.	843 658	905 640	800 907	907 408
10.	703 204	902 503	750 203	806 305

Multiply:

1.	$2.56 652	$3.75 573	$4.89 984	$5.38 853
2.	$7.63 367	$8.47 748	$6.29 592	$9.75 624
3.	$8.05 230	$9.06 350	$7.03 420	$6.04 560
4.	$5.09 730	$4.07 850	$3.09 970	$9.08 640
5.	$9.00 309	$8.00 208	$7.00 407	$6.00 506
6.	$5.00 609	$4.00 708	$3.00 804	$2.00 905
7.	$3.05 406	$4.07 608	$5.08 804	$6.09 908
8.	$9.03 504	$8.06 709	$6.05 308	$7.04 603
9.	$9.75 354	$9.07 608	$8.00 904	$7.08 409
10.	$5.04 302	$9.00 560	$7.50 230	$7.00 840

4,270
1 600
2 562 000
4 270 ← *DANGER SPOT*
6,832,000

0 times **4270** is **0.** → Write **0** under the first **0** to the right in the multiplier.
0 times **4270** is **0.** → Write **0** under the second **0** in the multiplier.
6 times **4270** is **25620.** → Write **25620** so that **0** is under the **6** in the multiplier.
1 times **4270** is **4270.** → Write **4270** so that **0** is in the same column as the **1** in the multiplier.
Add the partial products.

The product is **6,832,000.**
It is read: Six million, eight hundred thirty-two thousand.

LESSON 5. Four-Place Multiplier

Multiply:

1.	2460	1350	4680	3570
	1200	1300	1400	1500
2.	6420	5310	8640	7530
	1600	1700	1800	1900
3.	9870	8760	7650	5430
	2300	3500	4700	5900
4.	4320	4620	3510	5730
	6800	7600	8400	2600
5.	2340	3450	4560	5670
	3900	4600	5800	6300
6.	6780	7890	8920	9830
	3500	4700	5200	6900
7.	$35.60	$45.30	$69.70	$28.60
	2600	4800	8500	5700
8.	$98.70	$86.40	$75.90	$56.40
	7300	8500	6400	5600
9.	$85.20	$73.50	$62.30	$51.90
	2900	3700	8600	4600
10.	$96.15	$85.49	$76.28	$65.53
	1234	2345	3456	4567

Multiply:

1.	4370	2180	5460	7530
	2330	3540	2810	2840
2.	8602	6804	9705	5304
	3570	2460	1350	4720
3.	9700	8400	6300	4100
	2600	3500	4700	5400
4.	6300	8400	9500	7600
	2000	4000	5000	6000
5.	8700	9800	6900	3500
	7000	8000	9000	3000
6.	4308	4630	5809	6708
	3500	2800	2500	3900
7.	6500	8403	9605	7308
	2000	3000	4000	5000
8.	4650	7305	8960	7508
	6200	8400	3700	4900
9.	9640	8500	3704	6570
	6500	9000	7403	2480
10.	3578	4629	8476	5392
	4852	7316	6543	4291

6430 307 45 010 1 929 00 1,974,010	6040 305 30 200 1 812 00 1,842,200	$60.04 304 24 016 1 801 20 $18,252.16	6400 302 12 800 1 920 00 1,932,800	$60.50 320 121 000 1 815 0 $19,360.00

Account for all the zeros in the partial products.

LESSON 6. More Zeros in Multiplication

Multiply:

1.	9870 209	8760 308	7650 407	6540 506
2.	9020 902	8030 803	7040 704	6050 605
3.	9002 306	7003 204	5004 408	3005 905
4.	8400 503	6300 705	4200 903	7400 308
5.	8090 640	4050 460	9070 840	7060 270
6.	8650 702	8090 509	7008 605	6900 704

Solve:

1. Electric Basketball Timers cost $29.50. A salesman in a Sports Shop sold 405 in one month. How much money did he receive?
2. Table tennis balls cost $14.50 a gross. Find the cost of 706 gross.
3. Sweatshirts cost $15 a dozen. How much must a dealer pay for 405 dozen?

Multiply:

1.	$76.40 208	$85.30 305	$74.20 806	$68.60 704
2.	$90.05 802	$80.06 604	$70.05 406	$60.04 208
3.	$80.60 504	$90.50 209	$70.60 706	$80.30 405
4.	$84.00 406	$68.00 508	$36.00 703	$75.00 804
5.	$20.40 250	$40.60 370	$60.80 460	$80.40 580
6.	$80.90 450	$84.30 908	$90.20 408	$80.03 508

Solve:

1. Heavy weight sweaters may be purchased at $11.40 each. How much must a storekeeper pay for 306 of them?
2. An airplane travels 250 miles an hour on each trip it makes. How many miles an hour will it cover in 35 trips?
3. A high school football team bought 20 football sweaters at $4.50 each. What did they cost?

Practice With Problems

Solve:

1. Chocolate mints are $.75 per lb. This is $.15 less than the cost of a lb. of pecan patties. What is the cost of the patties?

2. A candy salesman sold 20 lb. of butter creams at $.80 a lb. How much money did he receive for them?

3. A 5-lb. box of mixed hard candy costs $2.75. How much must Mr. Donovan pay for 15 boxes?

4. A carton contains 100 one pound boxes of malted balls. How much will the entire carton cost at $1.25 a pound?

5. How much change will Mr. Dolan receive from a $10 bill if he buys 6 pounds of chocolate mints at $.75 per lb?

6. A 5-pound box of salted almonds costs $2.50. Find the cost of 150 boxes.

7. Coconut squares are packed in boxes of 3 lb. each. If each box costs $1.50, how much will a candy dealer pay for 50 boxes?

8. A 10-lb. box of chocolate mints sells for $6.25. A 10-lb. box of caramels sells for $5.00. Find the difference in these prices.

9. Assorted chocolates cost $1.35 per lb. Mr. Byrne sold 25 cartons of 50 lb. each. How much money did he take in?

10. The parents of the children in St. Joseph school are giving a party. They need 5 lb. of pecan patties at $.90 per lb., 3 lb. of butter creams at $.80 per lb., and 10 lb. of hard candy at $.60 per lb. What is the total cost of the candy?

11. Marshmallow fudge is $.95 per lb. How much change will Mrs. Carr receive from $10 if she buys 8 lb. for the school party?

12. In one week a candy salesman sold 300 boxes of assorted chocolates at $1.35 per box. Another week he sold 450 boxes. How much money did he take in for assorted chocolates?

Division Tables

0 ÷ 2 = 0
2 ÷ 2 = 1
4 ÷ 2 = 2
6 ÷ 2 = 3
8 ÷ 2 = 4
10 ÷ 2 = 5
12 ÷ 2 = 6
14 ÷ 2 = 7
16 ÷ 2 = 8
18 ÷ 2 = 9
20 ÷ 2 = 10
22 ÷ 2 = 11
24 ÷ 2 = 12

0 ÷ 3 = 0
3 ÷ 3 = 1
6 ÷ 3 = 2
9 ÷ 3 = 3
12 ÷ 3 = 4
15 ÷ 3 = 5
18 ÷ 3 = 6
21 ÷ 3 = 7
24 ÷ 3 = 8
27 ÷ 3 = 9
30 ÷ 3 = 10
33 ÷ 3 = 11
36 ÷ 3 = 12

0 ÷ 4 = 0
4 ÷ 4 = 1
8 ÷ 4 = 2
12 ÷ 4 = 3
16 ÷ 4 = 4
20 ÷ 4 = 5
24 ÷ 4 = 6
28 ÷ 4 = 7
32 ÷ 4 = 8
36 ÷ 4 = 9
40 ÷ 4 = 10
44 ÷ 4 = 11
48 ÷ 4 = 12

0 ÷ 5 = 0
5 ÷ 5 = 1
10 ÷ 5 = 2
15 ÷ 5 = 3
20 ÷ 5 = 4
25 ÷ 5 = 5
30 ÷ 5 = 6
35 ÷ 5 = 7
40 ÷ 5 = 8
45 ÷ 5 = 9
50 ÷ 5 = 10
55 ÷ 5 = 11
60 ÷ 5 = 12

0 ÷ 6 = 0
6 ÷ 6 = 1
12 ÷ 6 = 2
18 ÷ 6 = 3
24 ÷ 6 = 4
30 ÷ 6 = 5
36 ÷ 6 = 6
42 ÷ 6 = 7
48 ÷ 6 = 8
54 ÷ 6 = 9
60 ÷ 6 = 10
66 ÷ 6 = 11
72 ÷ 6 = 12

0 ÷ 7 = 0
7 ÷ 7 = 1
14 ÷ 7 = 2
21 ÷ 7 = 3
28 ÷ 7 = 4
35 ÷ 7 = 5
42 ÷ 7 = 6
49 ÷ 7 = 7
56 ÷ 7 = 8
63 ÷ 7 = 9
70 ÷ 7 = 10
77 ÷ 7 = 11
84 ÷ 7 = 12

0 ÷ 8 = 0
8 ÷ 8 = 1
16 ÷ 8 = 2
24 ÷ 8 = 3
32 ÷ 8 = 4
40 ÷ 8 = 5
48 ÷ 8 = 6
56 ÷ 8 = 7
64 ÷ 8 = 8
72 ÷ 8 = 9
80 ÷ 8 = 10
88 ÷ 8 = 11
96 ÷ 8 = 12

0 ÷ 9 = 0
9 ÷ 9 = 1
18 ÷ 9 = 2
27 ÷ 9 = 3
36 ÷ 9 = 4
45 ÷ 9 = 5
54 ÷ 9 = 6
63 ÷ 9 = 7
72 ÷ 9 = 8
81 ÷ 9 = 9
90 ÷ 9 = 10
99 ÷ 9 = 11
108 ÷ 9 = 12

Are You Sure of These?

into 2										
	12	10	2	6	4	8	16	18	14	0

into 3										
	0	9	18	27	12	3	21	6	15	24

into 4										
	16	24	8	0	4	36	12	28	20	32

into 5										
	30	40	20	10	15	5	35	0	25	45

into 6										
	24	36	6	42	0	18	30	12	54	48

into 7										
	14	28	42	56	7	0	35	21	49	63

into 8										
	0	8	16	72	24	64	32	56	48	40

into 9										
	0	27	45	9	63	18	81	54	36	72

LESSON 7. Short Division

$4\overline{)800}$ $\quad 200$ $\qquad$ $4\overline{)8000}$ $\quad 2000$ $\qquad$ $4\overline{)804}$ $\quad 201$ $\qquad$ $4\overline{)824}$ $\quad 206$ $\qquad$ $4\overline{)8240}$ $\quad 2060$ $\qquad$ $4\overline{)8003}$ $\quad 2000\frac{3}{4}$

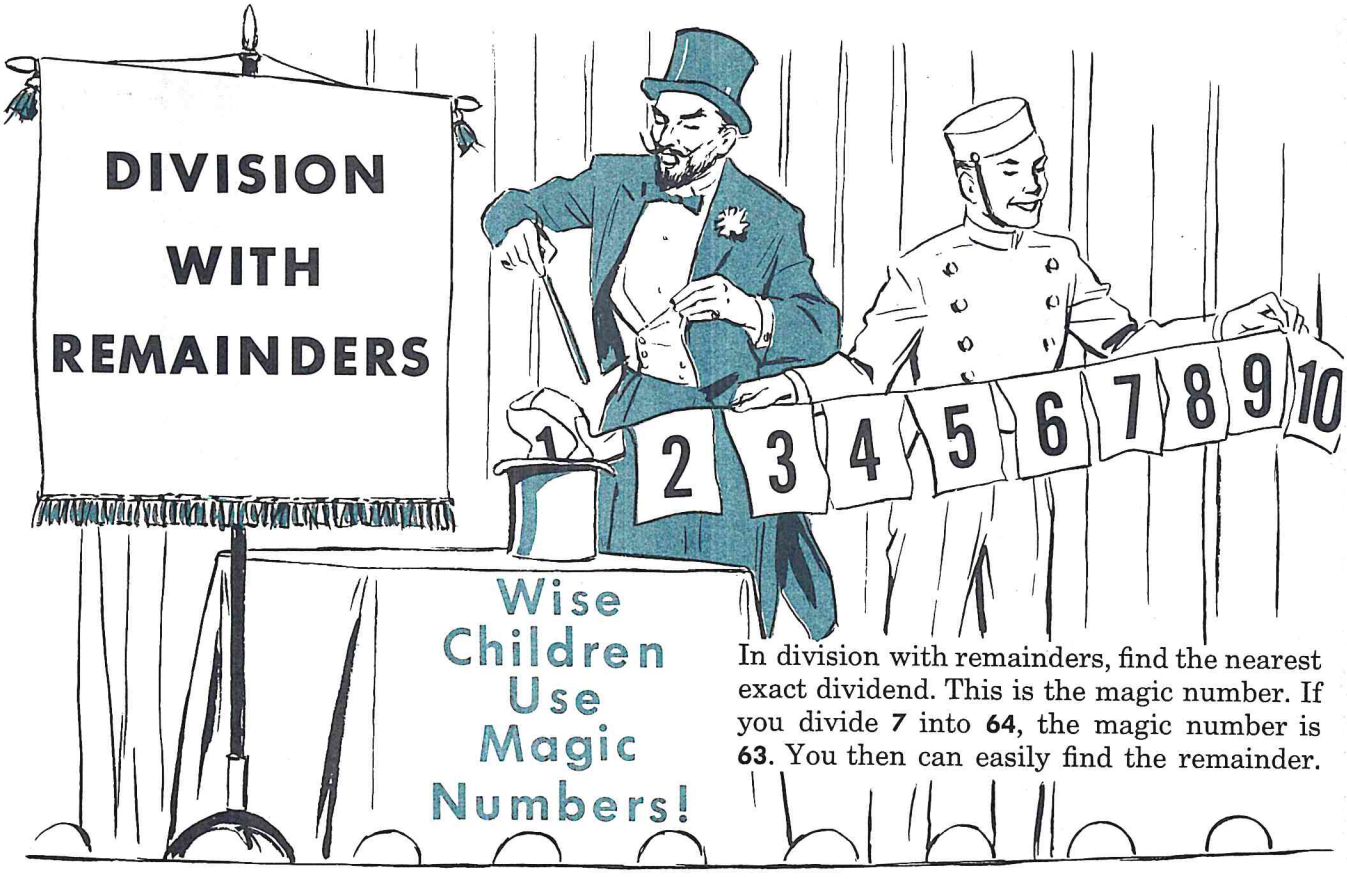
Account for the zero or zeros in each quotient.

Divide:

1.	$4\overline{)80}$	$6\overline{)60}$	$2\overline{)40}$	$3\overline{)90}$
2.	$2\overline{)200}$	$4\overline{)400}$	$2\overline{)600}$	$3\overline{)600}$
3.	$3\overline{)900}$	$5\overline{)500}$	$6\overline{)600}$	$7\overline{)700}$
4.	$8\overline{)800}$	$9\overline{)900}$	$3\overline{)300}$	$2\overline{)800}$
5.	$2\overline{)2000}$	$3\overline{)9000}$	$5\overline{)5000}$	$8\overline{)8000}$
6.	$2\overline{)802}$	$2\overline{)806}$	$2\overline{)408}$	$2\overline{)402}$
7.	$3\overline{)903}$	$3\overline{)306}$	$4\overline{)408}$	$6\overline{)606}$
8.	$7\overline{)707}$	$8\overline{)808}$	$9\overline{)909}$	$4\overline{)404}$
9.	$2\overline{)2004}$	$2\overline{)8002}$	$3\overline{)9006}$	$3\overline{)6009}$
0.	$4\overline{)4008}$	$4\overline{)8024}$	$5\overline{)5005}$	$5\overline{)5030}$
11.	$6\overline{)6036}$	$7\overline{)7056}$	$8\overline{)8024}$	$9\overline{)9036}$
12.	$2\overline{)614}$	$8\overline{)816}$	$4\overline{)412}$	$3\overline{)921}$
13.	$4\overline{)836}$	$4\overline{)872}$	$7\overline{)749}$	$6\overline{)642}$
14.	$9\overline{)963}$	$8\overline{)824}$	$5\overline{)535}$	$6\overline{)630}$
15.	$6\overline{)636}$	$7\overline{)728}$	$8\overline{)848}$	$9\overline{)981}$

Divide:

1.	$2\overline{)4120}$	$2\overline{)6180}$	$2\overline{)8140}$	$2\overline{)8160}$
2.	$3\overline{)6270}$	$3\overline{)9210}$	$3\overline{)3180}$	$3\overline{)6240}$
3.	$4\overline{)4280}$	$4\overline{)4160}$	$4\overline{)8120}$	$4\overline{)8280}$
4.	$5\overline{)5250}$	$5\overline{)5450}$	$5\overline{)5150}$	$5\overline{)5100}$
5.	$6\overline{)6120}$	$6\overline{)6360}$	$6\overline{)6480}$	$6\overline{)6300}$
6.	$7\overline{)7210}$	$7\overline{)7420}$	$7\overline{)7490}$	$7\overline{)7630}$
7.	$8\overline{)8240}$	$8\overline{)8320}$	$8\overline{)8400}$	$8\overline{)8160}$
8.	$9\overline{)9360}$	$9\overline{)9270}$	$9\overline{)9450}$	$9\overline{)9180}$
9.	$5\overline{)5004}$	$6\overline{)6002}$	$7\overline{)7005}$	$8\overline{)8003}$
10.	$9\overline{)1801}$	$9\overline{)6304}$	$8\overline{)7205}$	$8\overline{)4803}$
11.	$7\overline{)2870}$	$6\overline{)3660}$	$5\overline{)4515}$	$9\overline{)1881}$
12.	$8\overline{)8083}$	$7\overline{)1402}$	$6\overline{)4205}$	$4\overline{)3201}$
13.	$6\overline{)5401}$	$7\overline{)5603}$	$9\overline{)5407}$	$8\overline{)4005}$
14.	$9\overline{)9018}$	$8\overline{)1648}$	$7\overline{)2135}$	$6\overline{)2424}$
15.	$9\overline{)3663}$	$8\overline{)8180}$	$6\overline{)6005}$	$7\overline{)4203}$



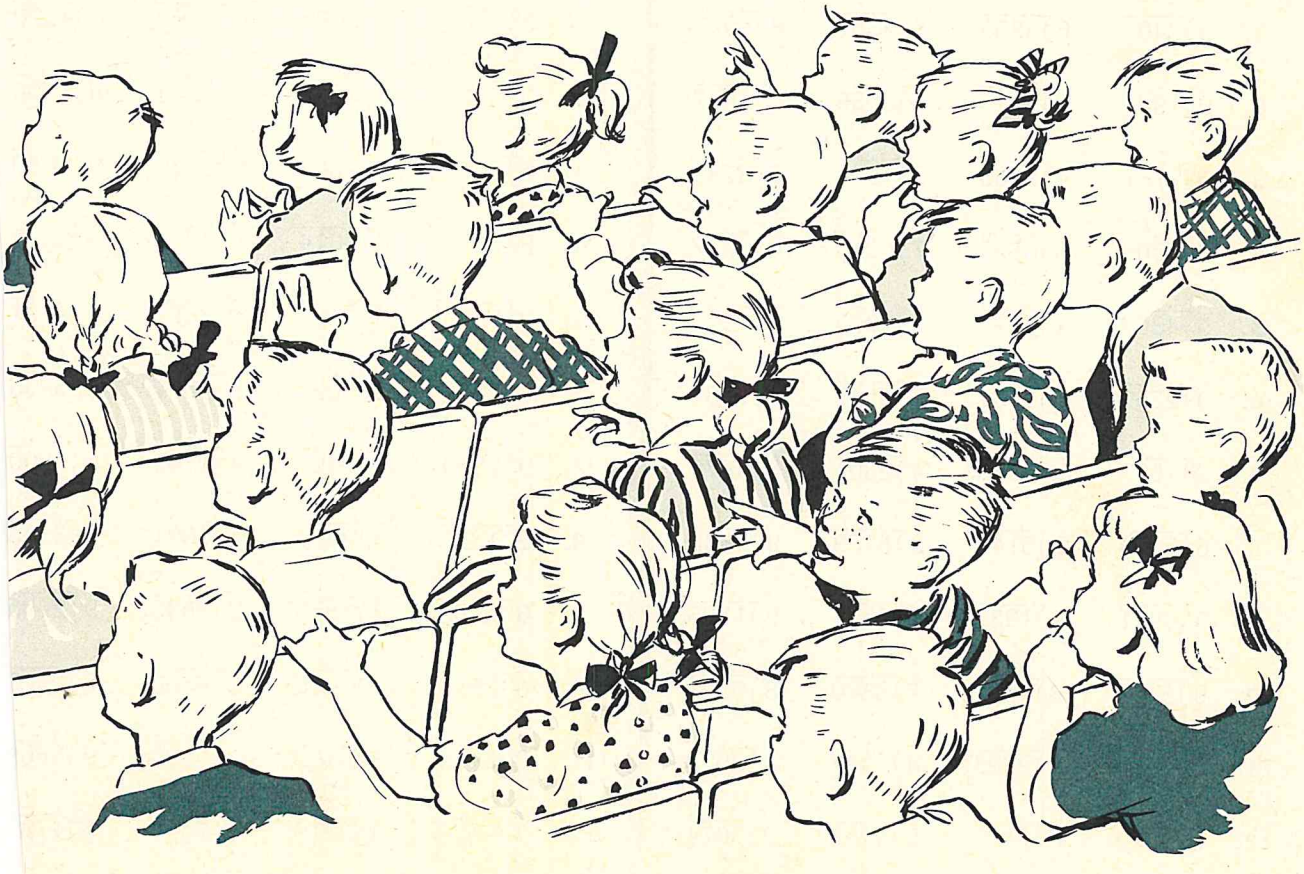
In division with remainders, find the nearest exact dividend. This is the magic number. If you divide **7** into **64**, the magic number is **63**. You then can easily find the remainder.

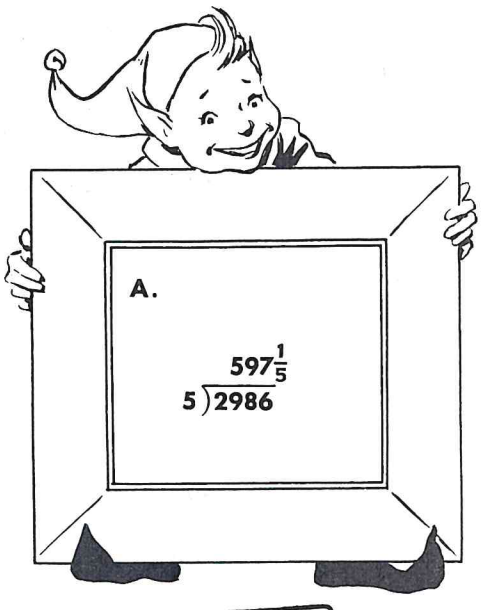
	1		2		3		4		5
2)	2	3	4	5	6	7	8	9	10	11
	6		7		8		9		
2)	12	13	14	15	16	17	18	19		
	1			2			3		
3)	3	4	5	6	7	8	9	10	11	
	4			5			6		
3)	12	13	14	15	16	17	18	19	20	
	7			8			9		
3)	21	22	23	24	25	26	27	28	29	
	1				2				
4)	4	5	6	7	8	9	10	11		
	3				4				
4)	12	13	14	15	16	17	18	19		
	5				6				
4)	20	21	22	23	24	25	26	27		
	7				8				
4)	28	29	30	31	32	33	34	35		
	9								
4)	36	37	38	39						
	1					2				
5)	5	6	7	8	9	10	11	12	13	

			3				4		
5)	14	15	16	17	18	19	20	21	22	
			5					6	
5)	23	24	25	26	27	28	29	30	31	
			7						8
5)	32	33	34	35	36	37	38	39	40	
					9				
5)	41	42	43	44	45	46	47	48	49	
	1						2		
6)	6	7	8	9	10	11	12	13	14	
				3					
6)	15	16	17	18	19	20	21	22	23	
	4						5		
6)	24	25	26	27	28	29	30	31	32	
				6					
6)	33	34	35	36	27	38	39	40	41	
	7						8		
6)	42	43	44	45	46	47	48	49	50	
				9					
6)	51	52	53	54	55	56	57	58	59	
	1							2	
7)	7	8	9	10	11	12	13	14	15	

					3			
7)	16	17	18	19	20	21	22	23	24
				4				
7)	25	26	27	28	29	30	31	32	33
		5							6
7)	34	35	36	37	38	39	40	41	42
							7		
7)	43	44	45	46	47	48	49	50	51
					8				
7)	52	53	54	55	56	57	58	59	60
			9						
7)	61	62	63	64	65	66	67	68	69
	1								2
8)	8	9	10	11	12	13	14	15	16
								3	
8)	17	18	19	20	21	22	23	24	25
							4		
8)	26	27	28	29	30	31	32	33	34
						5			
8)	35	36	37	38	39	40	41	42	43
					6				
8)	44	45	46	47	48	49	50	51	52

					7			
8)	53	54	55	56	57	58	59	60	61
				8				
8)	62	63	64	65	66	67	68	69	70
			9						
8)	71	72	73	74	75	76	77	78	79
	1								2
9)	9	10	11	12	13	14	15	16	17	18
								3	
9)	19	20	21	22	23	24	25	26	27	28
							4		
9)	29	30	31	32	33	34	35	36	37	38
						5			
9)	39	40	41	42	43	44	45	46	47	48
					6				
9)	49	50	51	52	53	54	55	56	57	58
				7					
9)	59	60	61	62	63	64	65	66	67	68
					8				
9)	69	70	71	72	73	74	75	76	77	78
				9					
9)	79	80	81	82	83	84	85	86	87	88





A.

$$5\overline{)2986} \quad 597\frac{1}{5}$$

Are you sure of your Magic Numbers?
In **A:**

1. Think: $5\overline{)29}$, 5 and 4 over.
   Write 5 above 9 and keep 4 in your mind to be placed before 8.
2. Think: $5\overline{)48}$, 9 and 3 over.
   Write 9 over 8 and keep 3 in your mind to be placed before 6.
3. Think: $5\overline{)36}$, 7 and 1 over.
   Write 7 above 6. The remainder 1 may be written over the divisor 5, as a fraction $\frac{1}{5}$.

Note: In **B**—the remainder is 2.
Write 2 over the divisor 6, as $\frac{2}{6}$.
Reduce $\frac{2}{6}$ to $\frac{1}{3}$.

B. $6\overline{)9500} \quad 1583\frac{2}{6}$

$1583\frac{2}{6} = 1583\frac{1}{3}$

LESSON 8. More Short Division

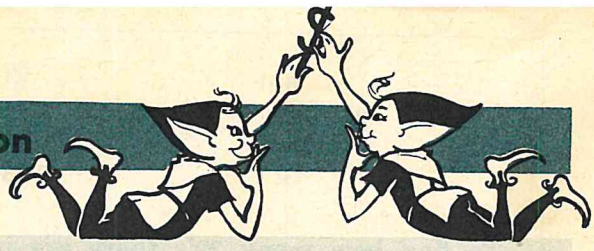
Divide:

1.	$5\overline{)3406}$	$6\overline{)3855}$	$7\overline{)4351}$	$8\overline{)5047}$
2.	$9\overline{)1901}$	$8\overline{)3525}$	$7\overline{)2536}$	$6\overline{)4477}$
3.	$5\overline{)2781}$	$4\overline{)2903}$	$3\overline{)1964}$	$6\overline{)3733}$
4.	$9\overline{)8506}$	$8\overline{)6657}$	$7\overline{)5960}$	$6\overline{)4637}$
5.	$5\overline{)4367}$	$4\overline{)3575}$	$3\overline{)1073}$	$2\overline{)1973}$
6.	$9\overline{)2359}$	$8\overline{)2987}$	$7\overline{)6547}$	$6\overline{)5731}$
7.	$2\overline{)1537}$	$3\overline{)2363}$	$4\overline{)2301}$	$5\overline{)4879}$
8.	$6\overline{)5303}$	$7\overline{)5147}$	$8\overline{)5139}$	$9\overline{)4808}$
9.	$5\overline{)3971}$	$4\overline{)1937}$	$3\overline{)2501}$	$2\overline{)1135}$
10.	$9\overline{)6708}$	$8\overline{)4507}$	$7\overline{)6870}$	$8\overline{)6701}$
11.	$3\overline{)2950}$	$4\overline{)2703}$	$5\overline{)3317}$	$6\overline{)3529}$
12.	$7\overline{)3929}$	$6\overline{)2119}$	$5\overline{)4238}$	$9\overline{)7678}$

Divide:

1.	$9\overline{)8502}$	$8\overline{)6602}$	$4\overline{)1902}$	$6\overline{)4520}$
2.	$9\overline{)6681}$	$4\overline{)3902}$	$8\overline{)3618}$	$6\overline{)3956}$
3.	$6\overline{)3562}$	$9\overline{)5802}$	$8\overline{)6730}$	$9\overline{)1950}$
4.	$8\overline{)5134}$	$6\overline{)2014}$	$9\overline{)4818}$	$4\overline{)3902}$
5.	$9\overline{)7500}$	$8\overline{)4426}$	$4\overline{)3822}$	$9\overline{)4701}$
6.	$6\overline{)2830}$	$9\overline{)3027}$	$9\overline{)4017}$	$8\overline{)5866}$
7.	$9\overline{)7554}$	$8\overline{)5300}$	$4\overline{)2702}$	$6\overline{)4000}$
8.	$2\overline{)1351}$	$3\overline{)2590}$	$4\overline{)1921}$	$5\overline{)3343}$
9.	$6\overline{)4585}$	$7\overline{)1830}$	$8\overline{)3539}$	$9\overline{)2905}$
10.	$6\overline{)3950}$	$7\overline{)3960}$	$8\overline{)4300}$	$9\overline{)8625}$
11.	$9\overline{)5984}$	$8\overline{)6103}$	$7\overline{)5990}$	$9\overline{)8665}$
12.	$5\overline{)4932}$	$4\overline{)3919}$	$3\overline{)2569}$	$6\overline{)478}$

LESSON 9. Money in Short Division



number bought
money (cost of 1)) money (cost of all)

money (cost of one)
number bought) money (cost of all)

$5.64\frac{1}{5}$
5)$28.21

Consider:

$.08)$.72 as 9)72

$.08)$16.24 as 203)1624

When the answer is to represent money, before you begin to divide:

Place a decimal point in the quotient directly above the decimal point in the dividend.

Divide:

1.	$.04)$.36	$.06)$.72	$.07)$.56
2.	$.09)$.81	$.08)$.64	$.05)$.45
3.	$.03)$.36	$.09)$.54	$.07)$.49
4.	$.07)$14.35	$.06)$36.18	$.09)$81.27
5.	$.08)$32.40	$.05)$25.45	$.07)$63.07
6.	$.09)$45.54	$.04)$32.16	$.08)$40.64
7.	$.06)$18.48	$.07)$63.21	$.09)$27.72
8.	$.09)$36.18	$.08)$24.32	$.07)$56.28
9.	3)$21.24	4)$36.32	5)$25.30
10.	6)$54.36	7)$63.14	8)$16.40
11.	9)$72.81	8)$65.60	7)$23.87
12.	8)$66.48	6)$39.06	9)$56.70
13.	9)$20.79	8)$43.28	7)$54.60
14.	4)$38.28	3)$29.19	5)$48.55
15.	6)$42.24	7)$68.60	9)$85.50

Divide:

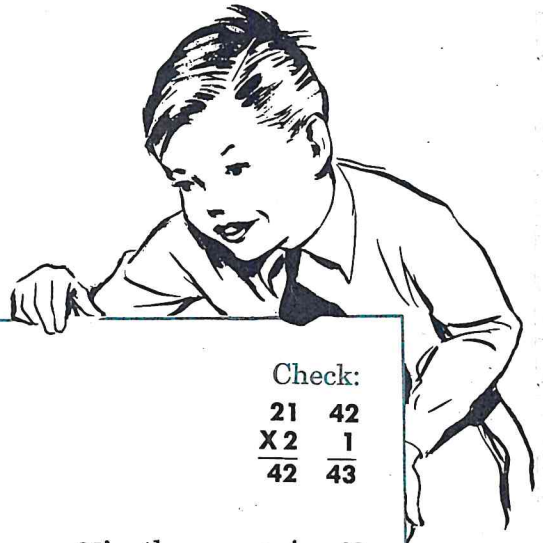
1.	$.06)$96.06	$.07)$98.07	$.09)$98.19
2.	$.07)$84.14	$.06)$96.12	$.08)$98.48
3.	$.09)$90.27	$.08)$64.96	$.06)$84.96
4.	$.04)$38.44	$.09)$20.70	$.08)$34.40
5.	$.06)$84.06	$.07)$49.91	$.09)$85.59
6.	$.08)$68.40	$.07)$30.87	$.06)$57.66
7.	$.08)$60.88	$.07)$68.95	$.06)$15.46
8.	$.09)$95.49	$.08)$97.68	$.07)$99.54
9.	$.05)$75.05	$.06)$86.94	$.07)$37.24
10.	9)$27.28	8)$64.57	7)$49.15
11.	6)$36.25	5)$45.26	4)$36.33
12.	3)$28.24	9)$82.82	8)$65.79
13.	7)$24.56	6)$43.21	9)$37.95
14.	$.06)$36.12	$.05)$25.55	$.08)$48.96
15.	$.09)$36.36	$.07)$65.94	$.06)$52.44

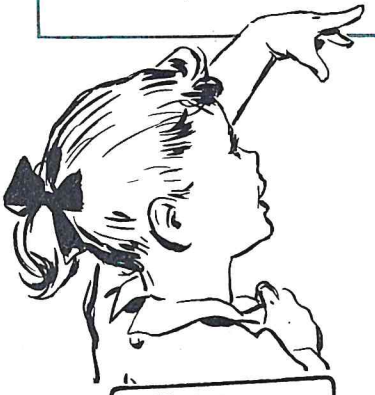
$$\begin{array}{r} 8 \\ 22\overline{)179} \\ 176 \\ \hline 3 \end{array}$$

Check:

$$\begin{array}{r} 22 \\ \times 8 \\ \hline 176 \end{array} \qquad \begin{array}{r} 176 \\ 3 \\ \hline 179 \end{array}$$

To find how many **22**'s there are in **179**, think: $2\overline{)17}$. Write **8** in the quotient directly above the **9** in the dividend. Multiply **22** by **8**. The product is **176**. Write **176** under **179** and subtract. The remainder is **3**.





$$\begin{array}{r} 2 \\ 21\overline{)43} \\ 42 \\ \hline 1 \end{array}$$

Check:

$$\begin{array}{r} 21 \\ \times 2 \\ \hline 42 \end{array} \qquad \begin{array}{r} 42 \\ 1 \\ \hline 43 \end{array}$$

To find how many **21**'s there are in **42**, think: $2\overline{)4}$. Write **2** in the quotient directly above the **3** in the dividend. Multiply **21** by **2**. The product is **42**. Write **42** under **43** and subtract. The remainder is **1**.

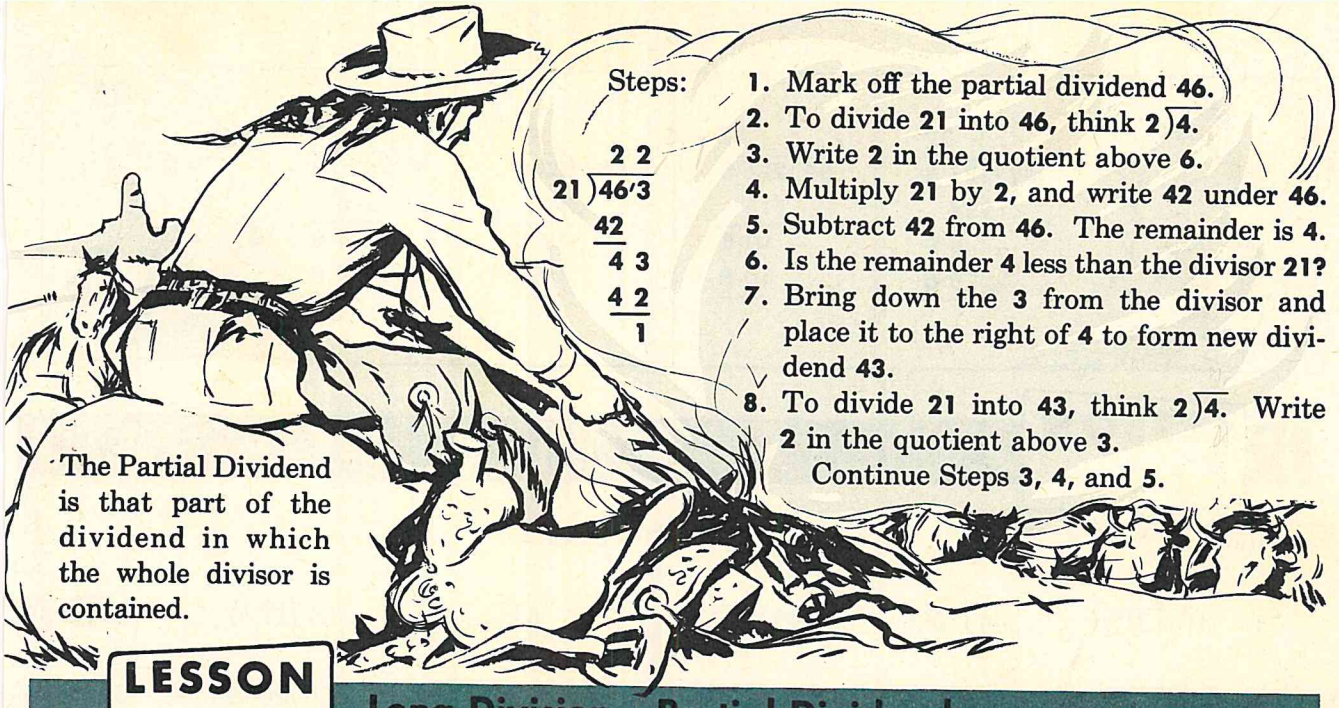
LESSON 10. Long Division

Divide and Check:

1.	$32\overline{)64}$	$42\overline{)84}$	$66\overline{)66}$	$24\overline{)48}$
2.	$22\overline{)66}$	$34\overline{)68}$	$31\overline{)93}$	$41\overline{)82}$
3.	$50\overline{)50}$	$70\overline{)70}$	$80\overline{)80}$	$20\overline{)80}$
4.	$33\overline{)67}$	$42\overline{)85}$	$24\overline{)49}$	$33\overline{)38}$
5.	$40\overline{)85}$	$44\overline{)89}$	$32\overline{)67}$	$31\overline{)64}$
6.	$25\overline{)29}$	$24\overline{)49}$	$44\overline{)48}$	$41\overline{)85}$
7.	$36\overline{)36}$	$44\overline{)98}$	$42\overline{)86}$	$31\overline{)93}$
8.	$23\overline{)69}$	$60\overline{)64}$	$40\overline{)85}$	$55\overline{)58}$
9.	$33\overline{)99}$	$33\overline{)68}$	$25\overline{)29}$	$41\overline{)84}$
10.	$43\overline{)87}$	$52\overline{)56}$	$35\overline{)39}$	$23\overline{)46}$

Divide and Check:

1.	$21\overline{)189}$	$31\overline{)155}$	$42\overline{)168}$	$51\overline{)255}$
2.	$61\overline{)366}$	$21\overline{)147}$	$31\overline{)217}$	$41\overline{)287}$
3.	$51\overline{)357}$	$43\overline{)129}$	$21\overline{)126}$	$31\overline{)186}$
4.	$21\overline{)127}$	$31\overline{)188}$	$41\overline{)289}$	$51\overline{)302}$
5.	$60\overline{)420}$	$71\overline{)497}$	$81\overline{)649}$	$41\overline{)329}$
6.	$22\overline{)154}$	$33\overline{)231}$	$45\overline{)225}$	$55\overline{)385}$
7.	$22\overline{)198}$	$34\overline{)136}$	$45\overline{)180}$	$52\overline{)416}$
8.	$62\overline{)196}$	$45\overline{)270}$	$44\overline{)358}$	$38\overline{)157}$
9.	$58\overline{)348}$	$79\overline{)257}$	$82\overline{)657}$	$65\overline{)455}$
10.	$38\overline{)192}$	$53\overline{)478}$	$46\overline{)277}$	$59\overline{)239}$



Steps:

$$\begin{array}{r} 2\ 2 \\ 21\overline{)463} \\ 42 \\ \hline 4\ 3 \\ 4\ 2 \\ \hline 1 \end{array}$$

1. Mark off the partial dividend **46.**
2. To divide **21** into **46,** think $2\overline{)4}$.
3. Write **2** in the quotient above **6.**
4. Multiply **21** by **2,** and write **42** under **46.**
5. Subtract **42** from **46.** The remainder is **4.**
6. Is the remainder **4** less than the divisor **21?**
7. Bring down the **3** from the divisor and place it to the right of **4** to form new dividend **43.**
8. To divide **21** into **43,** think $2\overline{)4}$. Write **2** in the quotient above **3.**

   Continue Steps **3, 4,** and **5.**

The Partial Dividend is that part of the dividend in which the whole divisor is contained.

LESSON 11. Long Division — Partial Dividend

Divide:

1.	$21\overline{)231}$	$31\overline{)341}$	$41\overline{)451}$
2.	$22\overline{)462}$	$23\overline{)483}$	$24\overline{)264}$
3.	$33\overline{)695}$	$32\overline{)992}$	$41\overline{)861}$
4.	$42\overline{)885}$	$23\overline{)693}$	$65\overline{)671}$
5.	$26\overline{)286}$	$25\overline{)275}$	$33\overline{)693}$
6.	$40\overline{)884}$	$30\overline{)996}$	$27\overline{)298}$
7.	$43\overline{)473}$	$34\overline{)378}$	$32\overline{)675}$
8.	$35\overline{)1470}$	$41\overline{)1677}$	$52\overline{)1300}$
9.	$23\overline{)1531}$	$35\overline{)1755}$	$31\overline{)1836}$
10.	$24\overline{)1224}$	$33\overline{)1782}$	$52\overline{)1404}$
11.	$54\overline{)3522}$	$42\overline{)3871}$	$21\overline{)1379}$
12.	$32\overline{)2676}$	$24\overline{)1044}$	$54\overline{)2331}$

Divide:

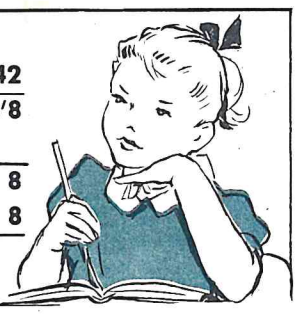
1.	$21\overline{)735}$	$23\overline{)976}$	$24\overline{)270}$
2.	$32\overline{)772}$	$34\overline{)424}$	$31\overline{)701}$
3.	$24\overline{)752}$	$34\overline{)723}$	$42\overline{)934}$
4.	$43\overline{)471}$	$44\overline{)930}$	$23\overline{)746}$
5.	$31\overline{)791}$	$32\overline{)769}$	$34\overline{)723}$
6.	$22\overline{)912}$	$33\overline{)702}$	$44\overline{)626}$
7.	$42\overline{)930}$	$32\overline{)778}$	$22\overline{)751}$
8.	$63\overline{)1512}$	$65\overline{)2025}$	$67\overline{)2814}$
9.	$72\overline{)2493}$	$75\overline{)1845}$	$81\overline{)4311}$
10.	$45\overline{)2844}$	$36\overline{)2612}$	$64\overline{)2904}$
11.	$72\overline{)3928}$	$63\overline{)4563}$	$75\overline{)6255}$
12.	$64\overline{)4648}$	$72\overline{)4635}$	$81\overline{)6165}$

$$\begin{array}{r} 32 \\ 43\overline{)137'6} \\ 129 \\ \hline 8\,6 \\ 8\,6 \\ \hline \end{array}$$

$$\begin{array}{r} 42 \\ 54\overline{)226'8} \\ 216 \\ \hline 10\,8 \\ 10\,8 \\ \hline \end{array}$$

$$\begin{array}{r} 43 \\ 66\overline{)283'8} \\ 264 \\ \hline 19\,8 \\ 19\,8 \\ \hline \end{array}$$

$$\begin{array}{r} 42 \\ 74\overline{)310'8} \\ 296 \\ \hline 14\,8 \\ 14\,8 \\ \hline \end{array}$$



LESSON 12. More Two-Place Quotients

Divide:

1.	$41\overline{)1312}$	$44\overline{)1056}$	$43\overline{)1032}$
2.	$44\overline{)1452}$	$42\overline{)1008}$	$41\overline{)1353}$
3.	$42\overline{)1386}$	$44\overline{)1496}$	$43\overline{)1419}$
4.	$53\overline{)1219}$	$55\overline{)1265}$	$54\overline{)1836}$
5.	$53\overline{)2438}$	$53\overline{)1113}$	$56\overline{)1232}$
6.	$55\overline{)1815}$	$56\overline{)1792}$	$53\overline{)1643}$
7.	$52\overline{)2132}$	$53\overline{)2332}$	$54\overline{)2322}$
8.	$54\overline{)1134}$	$56\overline{)1288}$	$54\overline{)1944}$
9.	$51\overline{)1836}$	$52\overline{)1768}$	$52\overline{)2236}$
10.	$55\overline{)2420}$	$52\overline{)2392}$	$54\overline{)1188}$
11.	$56\overline{)1344}$	$52\overline{)1820}$	$52\overline{)1976}$
12.	$51\overline{)1734}$	$54\overline{)2268}$	$54\overline{)2376}$
13.	$41\overline{)1353}$	$44\overline{)1540}$	$51\overline{)2142}$
14.	$56\overline{)1848}$	$55\overline{)2475}$	$54\overline{)2430}$
15.	$51\overline{)2193}$	$53\overline{)2491}$	$56\overline{)1904}$

Divide:

1.	$62\overline{)1302}$	$64\overline{)1728}$	$66\overline{)2838}$
2.	$63\overline{)1575}$	$65\overline{)2080}$	$62\overline{)1426}$
3.	$62\overline{)1984}$	$63\overline{)2205}$	$64\overline{)2048}$
4.	$65\overline{)2210}$	$63\overline{)1386}$	$66\overline{)1584}$
5.	$62\overline{)2232}$	$64\overline{)2688}$	$65\overline{)2795}$
6.	$61\overline{)1281}$	$64\overline{)1472}$	$65\overline{)2015}$
7.	$63\overline{)2268}$	$65\overline{)1430}$	$62\overline{)2170}$
8.	$72\overline{)1584}$	$71\overline{)1846}$	$74\overline{)1702}$
9.	$71\overline{)2982}$	$74\overline{)3108}$	$74\overline{)3922}$
10.	$76\overline{)3198}$	$71\overline{)1655}$	$73\overline{)1827}$
11.	$74\overline{)2378}$	$72\overline{)4830}$	$74\overline{)3189}$
12.	$73\overline{)3954}$	$76\overline{)3270}$	$73\overline{)1765}$
13.	$74\overline{)1659}$	$75\overline{)2450}$	$73\overline{)3075}$
14.	$75\overline{)3980}$	$73\overline{)3799}$	$71\overline{)1788}$
15.	$74\overline{)3876}$	$72\overline{)3980}$	$72\overline{)4893}$

A.
$$94\overline{)4898}\quad 52$$
470
198
188
10

B.
$$35\overline{)14809}\quad 423$$
140
80
70
109
105
4

C.
$$34\overline{)14280}\quad 420$$
136
68
68
0

D.
$$89\overline{)62308}\quad 700$$
623
08

Remember—When you bring a number down from the dividend, you must always put a number in the quotient. In **C** and **D** account for the zeros in the quotient.

LESSON 13. Two- and Three-Place Quotients

Divide:

1.	$83\overline{)3835}$	$87\overline{)2784}$	$82\overline{)2050}$
2.	$85\overline{)1870}$	$84\overline{)3528}$	$87\overline{)5394}$
3.	$81\overline{)3726}$	$85\overline{)3570}$	$86\overline{)3099}$
4.	$81\overline{)2835}$	$81\overline{)1909}$	$84\overline{)2268}$
5.	$82\overline{)2788}$	$84\overline{)2940}$	$83\overline{)1826}$
6.	$82\overline{)3772}$	$86\overline{)3612}$	$86\overline{)3784}$
7.	$86\overline{)4816}$	$83\overline{)3071}$	$86\overline{)4472}$
8.	$85\overline{)5270}$	$87\overline{)5481}$	$88\overline{)4048}$
9.	$82\overline{)2214}$	$86\overline{)4559}$	$83\overline{)3158}$
10.	$85\overline{)1785}$	$87\overline{)5569}$	$84\overline{)2359}$
11.	$91\overline{)4186}$	$94\overline{)4888}$	$93\overline{)3999}$
12.	$95\overline{)4465}$	$94\overline{)3196}$	$92\overline{)3312}$
13.	$93\overline{)5952}$	$92\overline{)2208}$	$96\overline{)3360}$
14.	$94\overline{)3108}$	$91\overline{)2436}$	$93\overline{)8835}$
15.	$95\overline{)3990}$	$95\overline{)2485}$	$92\overline{)3342}$

Divide:

1.	$46\overline{)18559}$	$58\overline{)18690}$	$34\overline{)18065}$
2.	$44\overline{)23968}$	$47\overline{)19756}$	$21\overline{)15141}$
3.	$54\overline{)28620}$	$55\overline{)38506}$	$45\overline{)13523}$
4.	$53\overline{)26540}$	$43\overline{)38743}$	$73\overline{)45260}$
5.	$73\overline{)45274}$	$72\overline{)66270}$	$64\overline{)33990}$
6.	$34\overline{)17714}$	$64\overline{)17740}$	$56\overline{)17920}$
7.	$42\overline{)33660}$	$32\overline{)20510}$	$45\overline{)13568}$
8.	$72\overline{)56960}$	$76\overline{)68413}$	$75\overline{)67521}$
9.	$57\overline{)22800}$	$63\overline{)31500}$	$65\overline{)52000}$
10.	$63\overline{)44390}$	$73\overline{)44092}$	$84\overline{)42059}$
11.	$86\overline{)68906}$	$98\overline{)78498}$	$89\overline{)62343}$
12.	$35\overline{)14700}$	$43\overline{)10750}$	$33\overline{)82500}$
13.	$45\overline{)18090}$	$75\overline{)15009}$	$84\overline{)25200}$
14.	$67\overline{)26863}$	$85\overline{)27500}$	$33\overline{)19806}$
15.	$42\overline{)14380}$	$82\overline{)74505}$	$93\overline{)84309}$

$$\begin{array}{r} 29 \\ 21\overline{)609} \\ 42 \\ \hline 189 \\ 189 \\ \hline \end{array}$$

1. Mark off Partial Dividend, **60**.
2. Think: How many **2**'s in **6**? **3**
3. Multiply mentally: $3 \times 21 = 63$
   63 cannot be subtracted from **60**.
4. Try **2**. $2 \times 21 = 42$
5. Write **2** in quotient above zero.
6. Continue steps.

LESSON 14. Introducing Trial Quotient

Divide:

1.	$21\overline{)808}$	$33\overline{)978}$	$23\overline{)607}$
2.	$34\overline{)928}$	$44\overline{)810}$	$33\overline{)935}$
3.	$22\overline{)818}$	$45\overline{)816}$	$35\overline{)955}$
4.	$46\overline{)834}$	$34\overline{)914}$	$25\overline{)704}$
5.	$26\overline{)912}$	$27\overline{)850}$	$28\overline{)309}$
6.	$36\overline{)1025}$	$44\overline{)1224}$	$45\overline{)1205}$
7.	$37\overline{)1104}$	$42\overline{)1250}$	$43\overline{)1207}$
8.	$37\overline{)1080}$	$22\overline{)1071}$	$54\overline{)1590}$
9.	$85\overline{)7395}$	$75\overline{)5244}$	$86\overline{)5865}$
10.	$68\overline{)5695}$	$66\overline{)5625}$	$25\overline{)1786}$
11.	$94\overline{)2785}$	$82\overline{)4000}$	$52\overline{)2020}$
12.	$63\overline{)4977}$	$75\overline{)2880}$	$83\overline{)4887}$
13.	$76\overline{)2128}$	$74\overline{)5080}$	$88\overline{)4200}$
14.	$66\overline{)3168}$	$77\overline{)3602}$	$86\overline{)7396}$
15.	$97\overline{)9407}$	$87\overline{)7569}$	$49\overline{)2401}$

Divide:

1.	$29\overline{)1015}$	$39\overline{)1496}$	$49\overline{)2062}$
2.	$59\overline{)2124}$	$69\overline{)3312}$	$79\overline{)3397}$
3.	$48\overline{)1680}$	$58\overline{)2436}$	$68\overline{)3604}$
4.	$78\overline{)4992}$	$87\overline{)3395}$	$67\overline{)3149}$
5.	$58\overline{)3074}$	$59\overline{)2242}$	$69\overline{)4216}$
6.	$89\overline{)3770}$	$38\overline{)2358}$	$79\overline{)2765}$
7.	$39\overline{)3123}$	$43\overline{)4093}$	$59\overline{)5122}$
8.	$34\overline{)3264}$	$44\overline{)4004}$	$52\overline{)5096}$
9.	$83\overline{)8076}$	$85\overline{)8280}$	$96\overline{)9195}$
10.	$82\overline{)8018}$	$75\overline{)7125}$	$68\overline{)4728}$
11.	$73\overline{)7038}$	$84\overline{)8232}$	$94\overline{)9356}$
12.	$49\overline{)1715}$	$94\overline{)9118}$	$79\overline{)7031}$
13.	$54\overline{)5130}$	$49\overline{)4508}$	$49\overline{)3048}$
14.	$91\overline{)21840}$	$89\overline{)34668}$	$58\overline{)21465}$
15.	$79\overline{)50767}$	$86\overline{)81886}$	$96\overline{)92165}$

```
   8 46
17)143'82
  136
  ----
    78
    68
    --
   102
   102
```

To divide **14382** by **17**
Mark off the partial dividend **143**.
To find how many times **17** is contained in **143**
Think: **1)14** A quotient figure can never be more than **9**. Try **9**.
Multiply **17** by **9**. The product **153** is greater than **143**. So **9** is too high. Try **8**.
Multiply **17** by **8**. The product **136** is less than **143**.
Write **8** in the quotient above the **3** in the dividend.
Write **136** under **143** and subtract.
Compare. The remainder **7** is less than the divisor **17**.
Bring down the **8** from the dividend and place it to the right of the remainder **7** to form the new partial dividend. Complete the example.

LESSON 15. The Teens in Division

Divide:

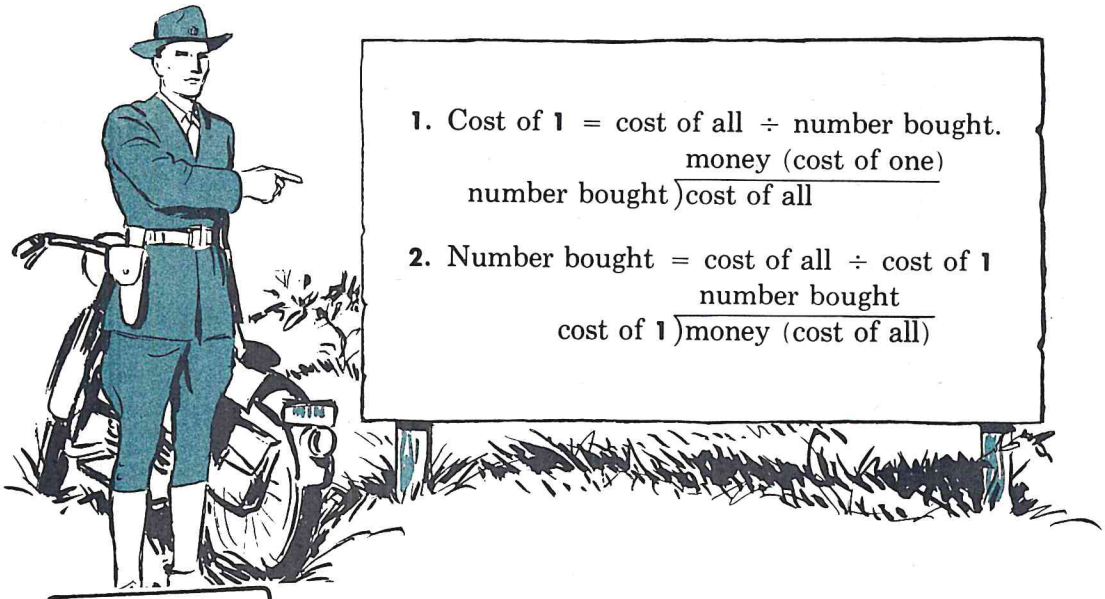
1.	13)403	14)602	15)590
2.	16)358	17)374	18)401
3.	19)504	13)370	14)686
4.	15)185	16)512	17)537
5.	18)858	19)789	13)873
6.	14)589	15)780	16)968
7.	17)585	18)756	19)950
8.	13)678	14)995	15)945
9.	16)352	17)359	18)938
10.	19)399	16)496	15)498

Divide:

1.	19)1159	18)1298	17)1197
2.	16)1296	15)1375	14)1150
3.	17)1603	13)1066	15)1405
4.	19)1558	18)1301	17)1105
5.	16)1170	13)1209	14)1202
6.	15)1455	16)1356	17)4005
7.	18)3795	19)7990	13)4069
8.	16)8496	14)9968	15)7680
9.	17)8891	18)5010	19)1560
10.	13)1225	15)1100	16)1456

Solve:

1. Mr. Dunn drives 930 miles in 15 hours. What is his average speed per hour?
2. There are 640 children enrolled in St. Thomas School. If there are 16 classrooms, find the average number of pupils in each room.
3. In our library there are 1020 books on 17 shelves. How many books are on each shelf?
4. 1620 canceled stamps are separated and put into 18 small boxes. How many stamps are in each box?



1. Cost of **1** = cost of all ÷ number bought.

   number bought) money (cost of one) / cost of all

2. Number bought = cost of all ÷ cost of **1**

   cost of **1**) number bought / money (cost of all)

LESSON 16. Money in Long Division

A. A dealer bought **23** fountain pens for **$103.50**. How much did each pen cost?

```
      $4.50  cost of 1 pen
23 ) $103.50
      92
      ---
      11 5
      11 5
      ----
```

B. **48** small note books cost **$4.32**. What is the cost of one?

```
       $ .09  cost of 1 book
48 ) $4.32
```

C. Readers are **$.79** each. Our teacher, Sister Gerard Marie, has **$19.75** to buy readers. How many can she buy?

Think of **$19.75** as **1975** cents and **$.79** as **79** cents. Then divide them as you do other numbers.

```
      25  readers
79 ) 1975
      158
      ---
      395
      395
      ---
```

Divide:

1.	83) $3.32	46) $2.30	37) $44.40
2.	53) $145.75	64) $120.96	73) $54.75
3.	45) $2.25	32) $2.88	41) $2.87
4.	54) $13.50	27) $140.40	49) $4.41
5.	83) $4.15	47) $4.23	65) $7.80
6.	33) $156.75	76) $190.00	29) $222.72
7.	45) $11.25	57) $13.11	68) $23.80
8.	75) $6.00	84) $36.12	35) $349.30
9.	$.24) $2.40	$.35) $8.40	$.85) $32.30
10.	$.96) $18.24	$.43) $11.61	$.54) $22.68
11.	$.61) $23.79	$.84) $20.16	$.39) $19.11
12.	$.97) $121.25	$.78) $195.00	$.63) $207.27
13.	$.48) $201.60	$.56) $204.40	$.95) $264.10
14.	$2.25) $56.25	$3.15) $75.60	$4.50) $135.00
15.	$5.20) $166.40	$3.75) $172.50	$4.35) $152.25
16.	$6.25) $375.00	$7.19) $395.45	$5.84) $426.32

LESSON 17. Three-Place Divisor

Don is working after school in a nearby drug store where he earns **$2.25** a week. He wants to buy a bicycle that will cost **$56.25**. How many weeks will Don have to work in order to pay for it?

To find the answer divide **$56.25** by **$2.25**. Think: **$2.25 = 225¢** **$56.25 = 5625¢**

```
      2 5
225 ) 562'5
      450
      ----
      112 5
      112 5
      -----
```

1. The partial dividend is **562**.
2. To divide **225**) **562**, think: **2**) **5**. Write **2** in the quotient over **2**.
3. Multiply **225** by **2**.
4. Subtract the product **450** from **562**. The remainder is **112**.
5. Compare the remainder **112** with the divisor **225**.
6. Bring down the next figure which is **5** and place it to the right of **112**.
7. To divide **225**) **1125**, think: **2**) **11**. Write **5** in the quotient over **5**.
8. Multiply **225** by **5**.
9. Subtract the product **1125** from **1125**.

Result: Don will have to work **25** weeks in order to pay for the bicycle.

Divide:

1.	315) 17325	460) 17020	820) 37720
2.	932) 14912	675) 11530	932) 24459
3.	846) 35545	763) 27478	521) 34897
4.	496) 18875	387) 24768	985) 43387
5.	867) 40749	749) 29261	653) 18284
6.	523) 26695	495) 31190	398) 28556
7.	976) 24400	824) 31320	736) 13984
8.	298) 28310	379) 31895	465) 28720
9.	570) 21660	694) 29870	786) 22794
10.	893) 16098	925) 23150	387) 35714
11.	465) 20925	529) 18515	637) 37196
12.	701) 44864	802) 36099	906) 48518

Divide:

1.	$6.85) $240.00	$2.50) $237.50
2.	$4.98) $363.54	$5.19) $319.59
3.	$6.24) $345.35	$7.35) $346.00
4.	$8.95) $330.10	$9.98) $290.45
5.	$4.63) $300.95	$5.28) $371.60
6.	$6.87) $400.46	$7.55) $367.95
7.	$8.25) $299.50	$9.63) $414.10
8.	$4.39) $375.25	$5.56) $405.32
9.	$6.49) $428.34	$7.15) $306.39
10.	$8.37) $418.72	$9.52) $602.75
11.	$4.50) $420.50	$5.75) $490.95
12.	$6.25) $475.00	$7.39) $550.86

Practice With Problems

1. For the Children's Home, Mr. Dinger bought 15 dolls at Jerry's Toy Store. If his bill was $52.50, what was the cost of each doll?

2. The music pupils in St. Thomas School are giving a musicale. They are charging $.75 per ticket. If they have already received $168.75 how many tickets have been sold?

3. The costumes for the Cub show presented by "Pack 51" cost $5.95 each. If the costumes cost $136.85, how many were bought?

4. At $7.95 each, how many girl scout uniforms can the treasurer buy for $63.60?

5. Mrs. Gallagher's milk bill for one month is $10.80. If she uses 60 quarts of milk each month, what is the price per quart?

6. New geography text books cost $1.25 apiece. How many can be obtained for $62.50?

7. A merchant paid $1620 for rugs that cost $324 each. How many rugs did he buy?

8. If a ship can travel 11,248 miles in 37 days, how many miles does it average each day?

9. The divisor is 115. The dividend is 23,345. Find the quotient.

10. Mr. Vitulli paid $1449 for typewriters. If they cost $63 each, how many did he buy?

11. Richard's grandfather who is a farmer told him he sold 76 tons of hay for $1140. Richard said that each ton was sold for $15. Is Richard correct?

12. In Cunane's clothing store, hats were sold for $8.75. If the sales last Saturday amounted to $157.50, how many hats were sold?

13. 250 yards of silk cost $812.50. What is the cost per yard?

14. The cost of a one-way train ticket for a trip from New York to Philadelphia is $4.03. How many round-trip tickets can Mr. Noel buy for $32.24?

15. The cost of the airline passage from New York to Shannon is $321. From New York to Rome the cost is $437. Find the difference in the cost of round trips to Shannon and Rome.

16. The plane fare from Paris to New York and back is $666. How many round-trip passages have been sold if the travel agency has received $15,984?

17. To travel by air from Lima, Peru, to Los Angeles, a passenger must pay $445. How many travelers are on the plane if $14,240 has been paid for the trip?

18. Camel's hair water color brushes are $1.75 a dozen. How many dozens can be purchased for $350?

19. Self-feeding pencil sharpeners cost $3.75 each. How many were sold if the sales amount to $562.50?

20. Rubber erasers, packed in boxes containing one gross each, may be bought for $2.40 a box. Find the cost of 250 boxes.

```
      389
376 ) 146264
      1128
      3346
      3008
       3384
       3384
```

```
      4268
85 ) 362780
      340
       227
       170
        578
        510
         680
         680
```

```
      3469
563 ) 1953067
      1689
       2640
       2252
        3886
        3378
         5087
         5067
           20
```

```
        36
3578 ) 129828
       10734
       22488
       21468
        1020
```

LESSON 18. Two-, Three-, and Four-Place Quotients

Divide:

1.	372) 91512	465) 173910
2.	753) 198149	573) 251389
3.	650) 276450	837) 518980
4.	689) 276289	920) 282750
5.	854) 446942	725) 253750
6.	543) 391277	638) 265908
7.	458) 263910	295) 140245
8.	364) 189495	489) 304048
9.	587) 437813	636) 541036
10.	981) 1621593	876) 4504392
11.	653) 2183632	790) 3242698
12.	564) 4096332	992) 2872932
13.	75) 365495	98) 946870
14.	89) 769869	67) 587583
15.	95) 727130	76) 750597

Divide:

1.	1234) 30850	2345) 84420
2.	3456) 138240	4231) 136392
3.	5210) 224030	6132) 275985
4.	7245) 383985	8356) 529784
5.	9135) 658420	6534) 559495
6.	9834) 29742	8765) 78885
7.	7964) 48784	6437) 51696
8.	5863) 52980	9463) 66842
9.	4873) 30738	8694) 69625
10.	375) 168750	950) 269800
11.	635) 1567180	740) 3133965
12.	256) 1211636	928) 1144852
13.	93) 524613	85) 321460
14.	3456) 31104	6712) 53898
15.	5673) 276309	9230) 524360

I. Practice With Problems

1. The Boy Scouts in St. James School have been saving their money for their yearly picnic. If 135 boys have each saved $2.50, how much money have they in the treasury?

2. The boys' expenses for the picnic are $215. The girls' expenses are $175. How much more than the girls will the boys spend?

3. The Scouts have invited the pupils of St. John's school to accompany them on their picnic. If $\frac{1}{6}$ of 1500 children accept the invitation, how many from St. John's will go on the picnic?

4. Including Scouts and guests there are 952 people who plan to go on the annual picnic. If the bus fare is $.35 each, how much money must be paid to the Bus Company?

5. The scoutmaster has ordered 14 buses for 952 people. How many passengers will be on each bus?

6. In addition to the 952 on the Scouts' picnic, 1350 other picnickers are expected in the park. How many people will be in the park? If the average number of tickets sold to each person is 25, how many tickets will be sold that day?

7. It costs $.50 to go swimming in Crystal Pool. If 35 Girl Scouts, 55 Boy Scouts, and 48 adults buy tickets for the pool, what is the total cost of their tickets?

8. In order to help the Scouts pay their expenses, the Cubs and Brownies are giving a show. If they charge $.15 admission and sell 375 tickets how much money will they collect?

9. The scoutmaster has ordered 11,424 amusement tickets for the 952 people attending the picnic. Find the average number of tickets bought for each person.

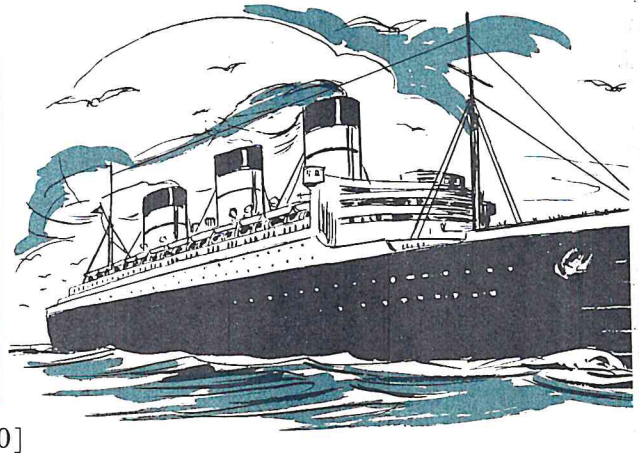
10. Each picnic lunch prepared by the Scouts' mothers costs $.75. How much will it cost to pack 250 lunch boxes?

II. Practice With Problems

1. The *Queen Elizabeth*, the world's largest ocean liner, weighs 83,673 tons. The *Queen Mary*, the fastest liner in the world weighs 81,235 tons. What is the total tonnage of the two *Queens?*

2. The *Queen Elizabeth* is 1,031 feet long. The *Queen Mary* is 1,020 ft. long. How many yards longer than the *Queen Mary* is the *Queen Elizabeth?*

3. The *Queen Mary* has 2 anchors, the *Queen Elizabeth* has 3. If each anchor weighs 16,000 pounds, how many tons do the anchors of both ships weigh?



4. To travel first class on the *Queen Mary* from New York to Southampton costs $365. How much would 45 round-trip passages cost?

5. The *Queen Mary* can carry 1,995 passengers. The *Queen Elizabeth* accommodates 2,314. How many people can travel on the world's two wonder ships?

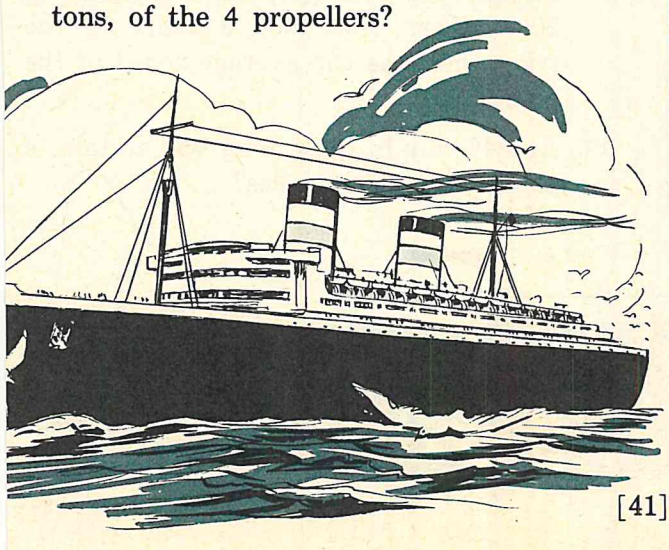
6. During their war careers the *Queen Elizabeth* and the *Queen Mary* together carried about 1,500,000 passengers. How many fewer than 2,000,000 is this?

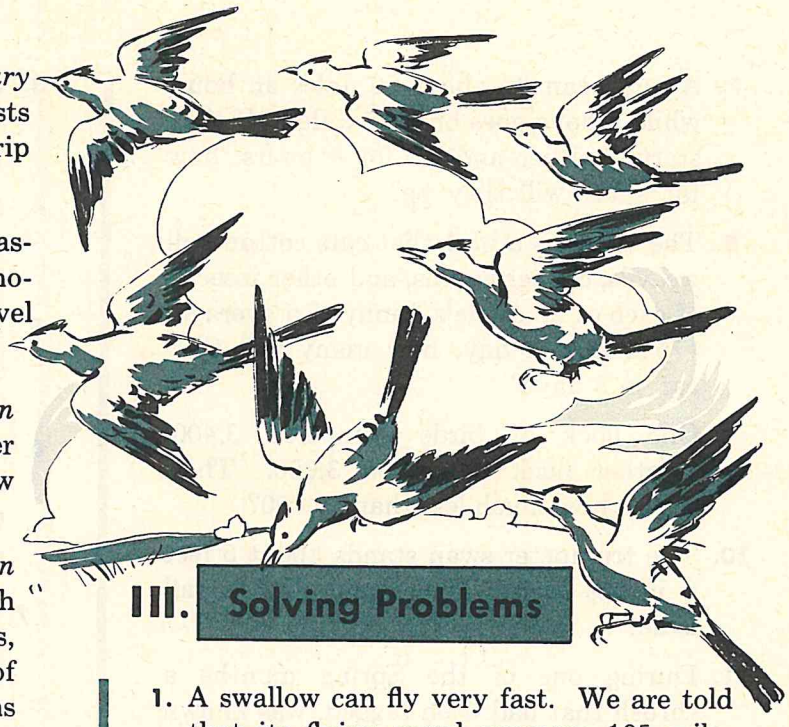
7. On one round-trip voyage the *Queen Elizabeth* carried 30,000 lb. of fresh vegetables, 10,000 lb. of frozen vegetables, 70,000 lb. of meat and 25,000 lb. of poultry. How many lb. of food items were in the refrigeration plant of the *Queen Elizabeth?*

8. The S.S. *Queen Mary* weighs 81,235 tons. The S.S. *Washington* weighs 29,627 tons. What is the difference in their tonnage?

9. To accommodate the thousands of people aboard the *Queen Elizabeth* there were 210,000 towels, 30,000 sheets, 31,000 pillow cases and 21,000 table cloths in the linen room. If the linen supplies included 300,000 pieces, how many other pieces of linen were there?

10. Each propeller on the *Queen Mary* weighs 70,000 lb. What is the total weight in tons, of the 4 propellers?





III. Solving Problems

1. A swallow can fly very fast. We are told that its flying speed averages 105 miles an hour. At this rate, how long will it take a swallow to fly 945 miles?

2. A U.S. Army pigeon is said to have flown a distance of 658 miles in 14 hours. What was its average speed?

3. It is believed that a purple martin can eat about 60 mosquitoes in one minute. At that rate how many can it eat in 40 minutes?

4. Some birds fly about 3000 ft. above the ground. Larger birds fly about 8000 feet above the ground. What is the difference in these heights? How much less than a mile high do the smaller birds fly? How much more than a mile high do the larger birds fly?

5. When the birds were flying south, it was thought that in one day 20,000 birds left in the morning, and 19,540 left in the evening. How many more left in the morning?

6. In the autumn the yellow legs fly from the Arctic Circle to Argentina a distance of about 8056 miles. If their flying speed is 106 m.p.h., how long does it take them to make the trip?

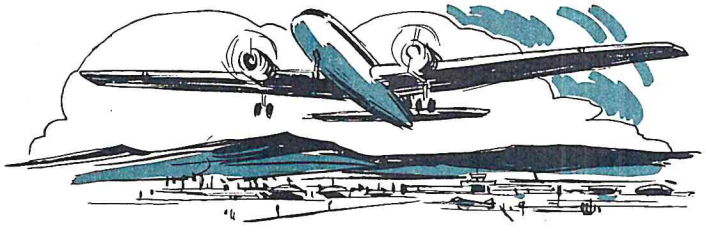
7. A quail can fly about 56 miles an hour, while a dove goes only 37 miles. If they start together and fly for 4 hours, how far apart will they be?

8. The oriole is a bird that eats cotton boll weevils, canker worms, and other insects. If each of an oriole's family of 5 averages 175 insects a day, how many will they eat in 3 days?

9. One flock of birds numbered 3,400. Another flock numbered 3,000. Their sum is how much less than 10,000?

10. The trumpeter swan stands about 5 feet 6 inches high? How many inches tall is he?

11. During one of the Spring months a thrush that had been tagged, was known to travel 3900 miles in 30 days. How many miles did it cover each day?



IV. More Problems to Solve

1. An air pilot in training flew his plane 630 miles on Monday, 678 miles on Tuesday, 756 miles on Wednesday, and 820 miles on Thursday. What was the total mileage?

2. One pilot weighs 159 pounds. Another weighs 173. How much lighter is the first than the second?

3. If a plane uses 130 gallons of gasoline per hour, how many gallons will it use in a 12 hour flight?

4. A ship carrying pilgrims to Rome travelled 4200 miles in 8 days. How many miles did the ship average per day?

5. If a plane averages 216 miles per hour, how long will it take it to make a trip of 2592 miles?

6. An airplane flying about 204 miles an hour, can make the trip from New York to London in 17 hours. What is the mileage by air between these two cities?

7. There were 300 planes in an airplane plant. If they were arranged 12 in a row, how many rows were there?

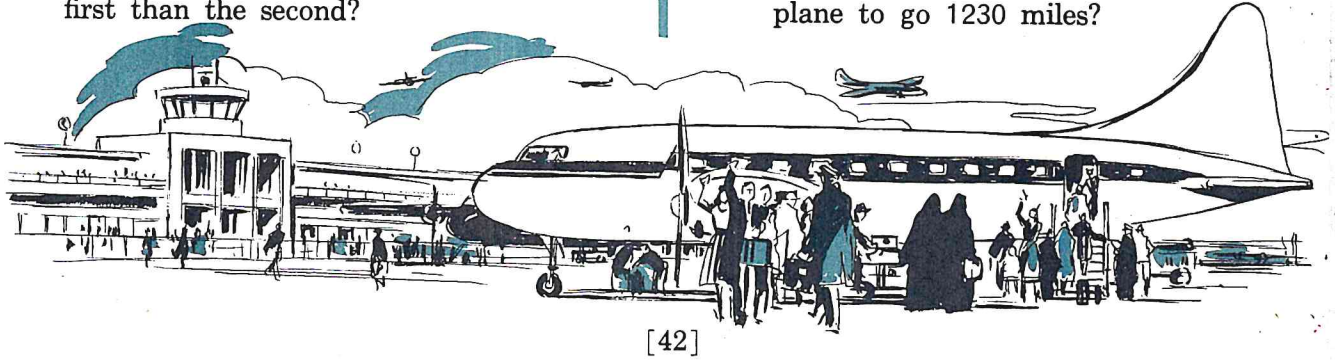
8. From China to New York, the air mileage is about 7500 miles. What speed would an airplane have to average to make the flight in 30 hours?

9. The distance from Chicago to Alaska is about 2730 miles by air. At an average speed of 195 miles an hour, how long will it take a pilot to fly this distance?

10. A plane is flying from one airport to another. After flying 450 miles, the plane has yet to go 270 miles. How far apart are the airports?

11. Michael traveled by plane a distance of 2007 miles. If it took 9 hours for the trip, what was the average speed of the plane?

12. At 246 m.p.h., how long will it take a plane to go 1230 miles?



UNIT 2 Test

Part I

1. Zero times any number is ....(?)....
2. Any number times zero is ....(?)....
3. Zero divided by any number is ....(?)....
4. The answer in multiplication is called the ....(?)....
5. The answer in division is called the ....(?)....
6. In the example $75\overline{)16725}$, 167 is called the ....(?)...., (?)...., 16725 is the (?)..... and 75 is the ....(?)....
7. When dividing 83 by 9, the helping number is ....(?)....

Part II

1. One furrier bought a certain kind of fur coat for $390. What did he pay for 40 of them?
2. Father Larkin paid $50.40 for 42 new fifth grade geographies. How much did each cost?
3. In one section of a large factory 834 people are employed. If the weekly pay roll is $43,368, what is the average amount paid to each worker?
4. If a plane averages 320 miles an hour, how far will it go in 20 hours?
5. If a plane averages 290 miles an hour, how long will it take to go 3,480 miles?

Part III

1	693 ×25	806 ×79	590 ×80
2.	368 ×409	670 ×508	905 ×406
3.	800 ×60	900 ×400	700 ×805
4.	7000 ×406	9000 ×850	4000 ×600
5.	$68.75 ×92	$74.80 ×60	$49.50 ×800

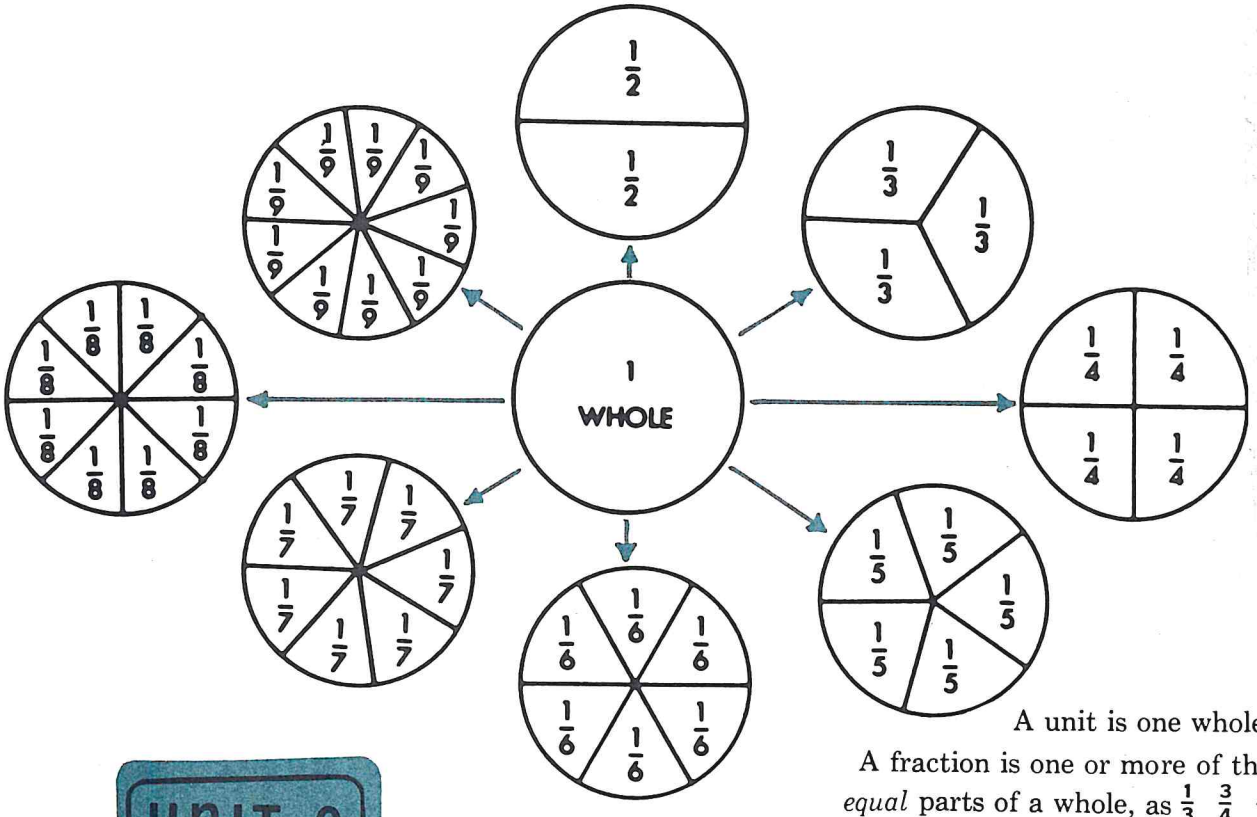
Part IV

1.	$8\overline{)363}$	$9\overline{)468}$	$6\overline{)3624}$
2.	$7\overline{)5080}$	$.06\overline{)\$48.42}$	$9\overline{)\$56.70}$
3.	$83\overline{)\$2822}$	$.35\overline{)\$232.95}$	$18\overline{)\$8406}$
4.	$409\overline{)25767}$		$2.35\overline{)\$107.50}$
5.	$306\overline{)165240}$		$5.24\overline{)\$4433.04}$

Part V

Supply the missing words and solve:

1. 5 kindergarten tables cost $200. To find the cost of 1, ...(?)..... the cost of all by the number ....(?)....
2. Magic drawing books are $.35 each. To find how many can be bought for $17.50, ...(?)..... the cost of all by the cost of ....(?)....



A unit is one whole.

A fraction is one or more of the *equal* parts of a whole, as $\frac{1}{3}$ $\frac{3}{4}$ $\frac{5}{6}$.

UNIT 3 ● INTRODUCING FRACTIONS

A unit may be divided into two equal parts. Each of these parts is called one half, and is written $\frac{1}{2}$. If a unit is divided into three equal parts, each of these equal parts is called one third and is written $\frac{1}{3}$. A unit may be divided into any number of equal parts as is shown in the picture above. One or more of these equal parts is called a fractional part of the whole. For example, John is eating $\frac{1}{8}$ of the whole pie.

There are seven eighths of the whole pie remaining. In the whole pie there are $\frac{8}{8}$.

If a unit is divided into 4 equal parts, each part is called $\frac{1}{4}$ of the whole. If a unit is divided into 6 equal parts, each part is called $\frac{1}{6}$ of the whole.

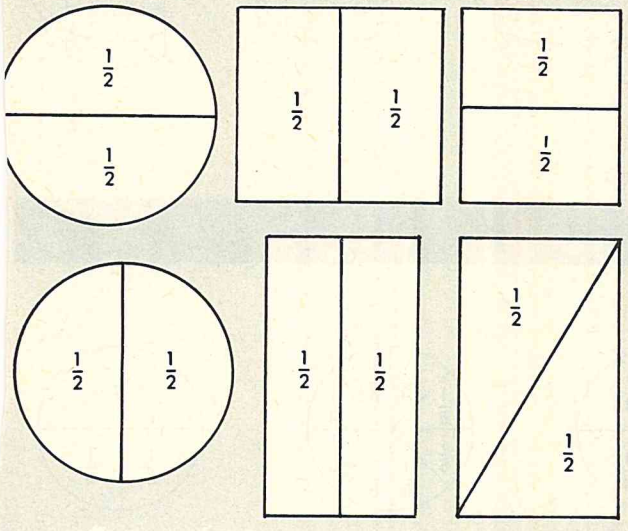
How Well Do You Remember?

Give the answers orally:

1. A unit is (?) whole.
2. A fraction is one or more (?) parts of a whole.
3. If a unit is divided into three equal parts, each part is called one third and is written (?) .
4. In one whole, there are $\frac{?}{8}$.
5. One sixth is written (?) .
6. Two thirds is written (?) .
7. When Bill took $\frac{1}{8}$ of the whole there were $\frac{?}{8}$ remaining.
8. Seven eighths and $\frac{?}{8}$ equal 1 whole.
9. $\frac{2}{2}$ has the same value as $\frac{?}{4}$
10. $\frac{3}{3}$ has the same value as $\frac{?}{6}$.

LESSON 1. Halves and Fourths

$\frac{1}{2}$ is read: one half



Look at the pictures above and see if you can give the answers orally.

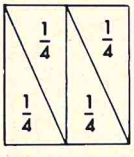
$\frac{1}{2}$ is equal to $\frac{1}{4}$ and (?).

$\frac{2}{2}$ is equal to (?) whole.

$\frac{4}{4}$ is equal to one (?).

$\frac{1}{4}$ and $\frac{3}{4}$ are equal to $\frac{?}{4}$.

$\frac{1}{2}$ and $\frac{1}{2}$ are equal to $\frac{?}{2}$ or (?).



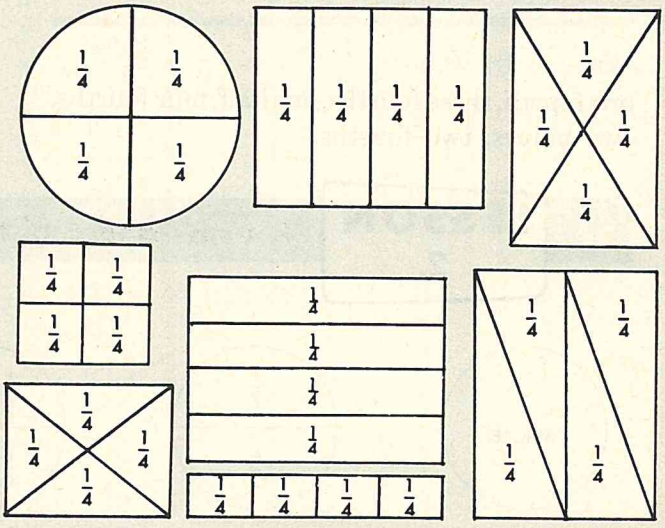
This oblong is divided into (?) equal parts.

Each part is called (?) fourth of the whole.

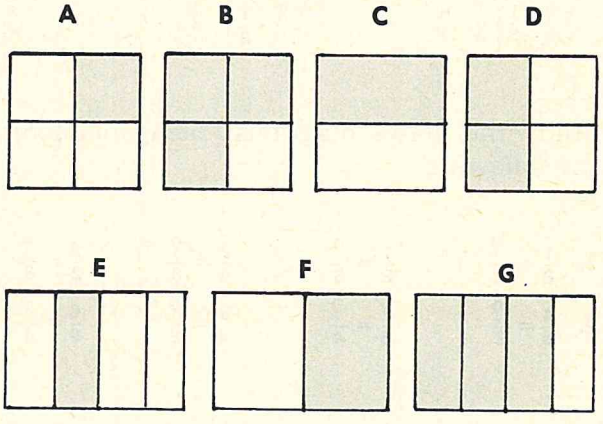
In the whole there are (?) fourths.

A unit is called a (?).

$\frac{1}{4}$ is read: one fourth



Look at each square below and tell the fractional part that is shaded.



Give the answers orally:

$1 = \frac{?}{2}$ $\quad \frac{1}{2} = \frac{?}{4}$

$1 = \frac{?}{4}$ $\quad \frac{2}{2} = \frac{?}{4}$

Which is larger, which are equal?

$\frac{1}{2}$ or $\frac{1}{4}$ $\quad \frac{1}{2}$ or $\frac{3}{4}$ $\quad \frac{2}{4}$ or $\frac{1}{2}$ $\quad \frac{4}{4}$ or 1

$\frac{2}{2}$ or 1 $\quad \frac{1}{4}$ or $\frac{3}{4}$ $\quad \frac{1}{4}$ or $\frac{4}{4}$ $\quad \frac{2}{2}$ or $\frac{3}{4}$

Draw a circle.

Divide it into fourths.

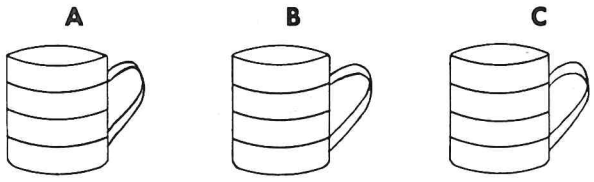
Shade one fourth of the circle.

What fractional part of the circle is not shaded?

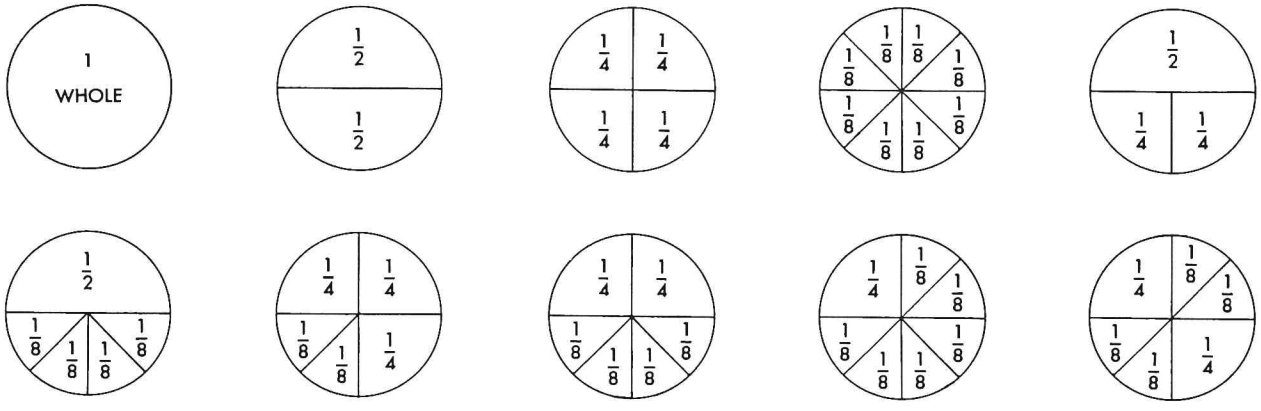
Write as fractions:

one fourth, three fourths, one half, four fourths, two halves, two fourths.

What part of each cup is filled?



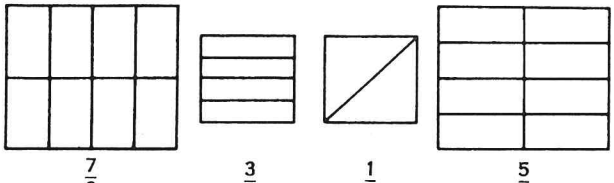
LESSON 2. Fourths and Eighths

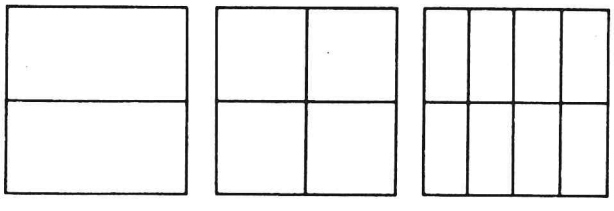


Study the above diagrams, then complete the following:

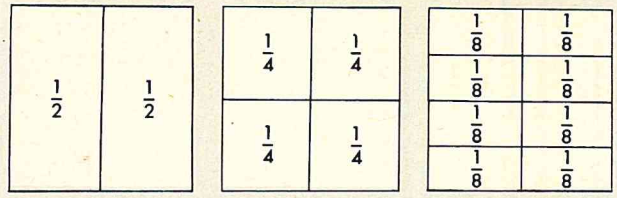
1. $\frac{1}{2}=\frac{?}{4}$ $\frac{1}{2}=\frac{?}{8}$ $\frac{2}{4}=\frac{?}{8}$ $\frac{2}{2}=\frac{?}{8}$
2. $\frac{4}{8}=\frac{?}{2}$ $\frac{2}{8}=\frac{?}{4}$ $\frac{3}{4}=\frac{?}{8}$ $\frac{6}{8}=\frac{?}{4}$

Copy the following figures and shade them according to the fractions underneath.





1. In figure A, the two parts are called . . ? . .
2. Each part of Figure B is called . . ? . .
3. Two . . . . ? . . . . = one half.
4. Four . . . ? . . . . = one whole.
5. Each part of Figure C is called . . ? . .
6. Four . . ? . . = one half.
7. Two . . ? . . = one fourth.
8. Six . . ? . . = three fourths.



Which is larger and which are equal?

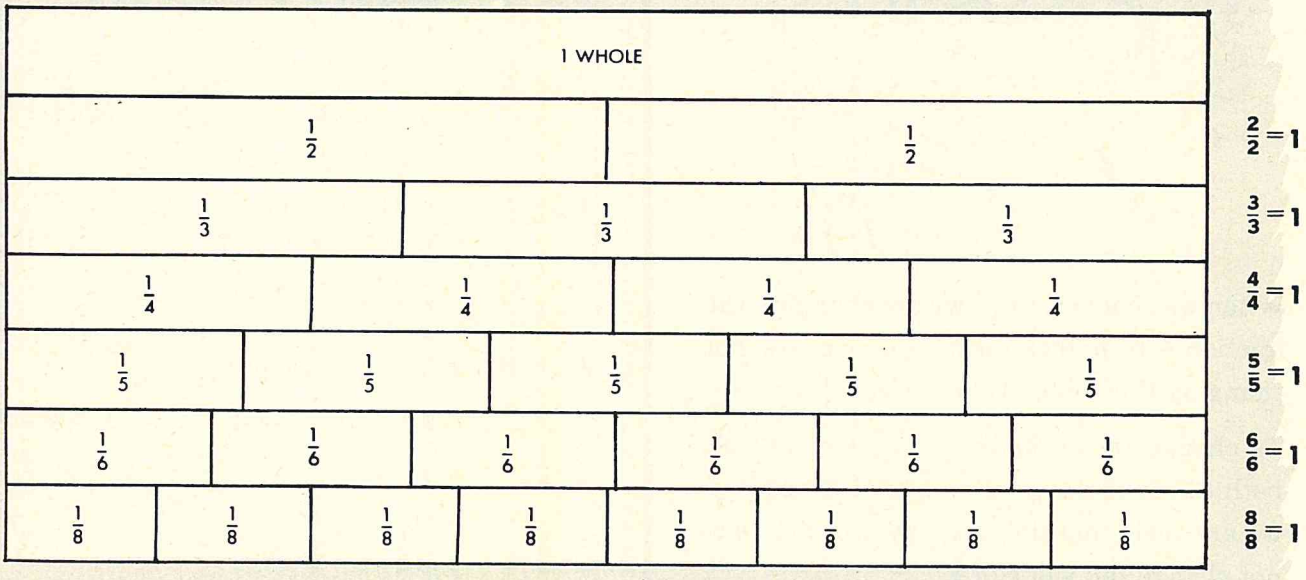
1. $\frac{1}{2}$ or $\frac{1}{4}$ of a unit? $\frac{2}{8}$ or $\frac{1}{4}$ of a unit?
2. $\frac{1}{4}$ or $\frac{1}{8}$ of a unit? $\frac{3}{8}$ or $\frac{1}{2}$ of a unit?
3. $\frac{2}{4}$ or $\frac{1}{2}$ of a unit? $\frac{4}{8}$ or $\frac{1}{2}$ of a unit?

Terms of a Fraction

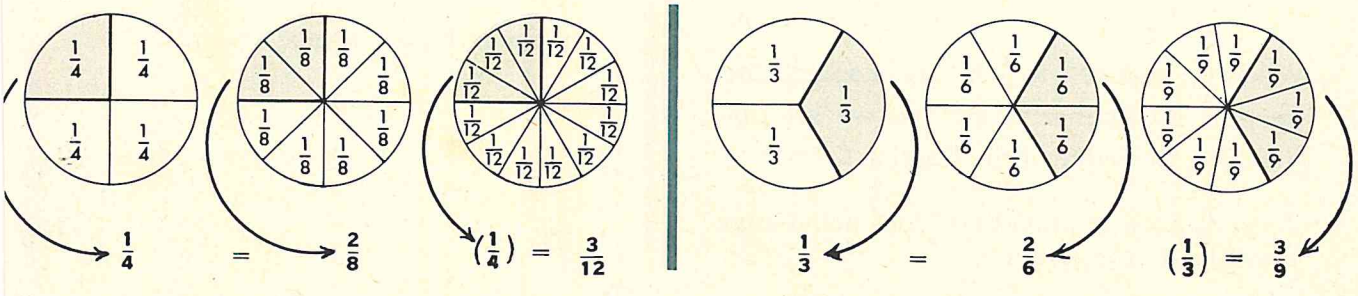
If a whole is cut into eight equal parts, and **5** of the **8** parts are used, we express this as $\frac{5}{8}$. $\frac{5}{8}$ is read "five eighths."
The 8 tells the name of the parts into which the whole has been divided. The **5** tells us the number of parts now being considered.
5 numerator tells the number of parts
8 denominator tells the name or the size of the parts.
We call the numerator and the denominator the *terms* of the fraction.

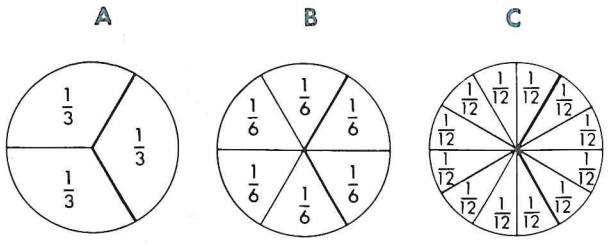
LESSON 3. Changing Fractions to Higher Terms

The figure "**1**" can be dressed in many different suits just as you are dressed for school and for play.



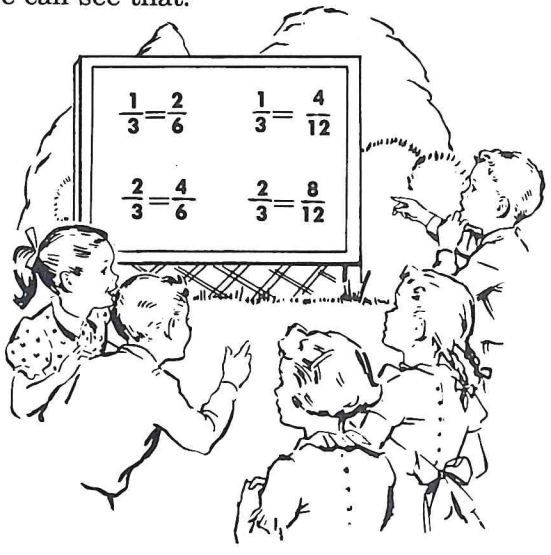
$1 = \frac{2}{2}$ or $\frac{3}{3}$ or $\frac{4}{4}$ or $\frac{5}{5}$ or $\frac{6}{6}$ or $\frac{8}{8}$, and so on.





Draw three circles in your notebook and divide them as in A, B, and C. Shade the part in figures B and C that are equal to $\frac{2}{3}$ in figure A.

We can see that:



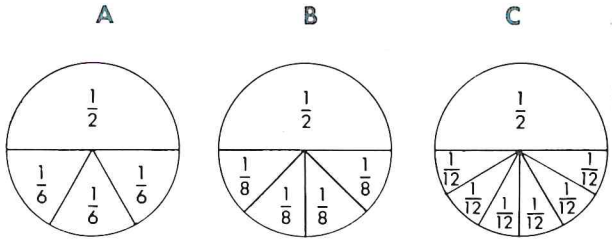
When we change $\frac{2}{3}$ to $\frac{8}{12}$, we are changing the fraction $\frac{2}{3}$ to higher terms, but we are not changing the value of the fraction $\frac{2}{3}$.

To change a fraction like $\frac{2}{3}$ to $\frac{8}{12}$, we multiply both terms of the fraction $\frac{2}{3}$ by 4. Since $\frac{4}{4}=1$, we are really multiplying $\frac{2}{3}$ by 1, which does not change the value of $\frac{2}{3}$.

$$\frac{2}{3}=\frac{2\times4}{3\times4}=\frac{8}{12}$$

When we change $\frac{1}{2}$ to $\frac{3}{6}$, we are changing the fraction $\frac{1}{2}$ to higher terms, but we are not changing the value of the fraction $\frac{1}{2}$.

To multiply a fraction by 1, does not change the value of the fraction.



Draw three circles and divide them as in A, B, and C. You will see that:

$$\frac{1}{2}=\frac{3}{6} \qquad \frac{1}{2}=\frac{4}{8} \qquad \frac{1}{2}=\frac{6}{12}$$

There is a short way of changing a fraction to higher terms, for example:

$$\frac{2}{3}=\frac{?}{12}$$

Step 1—Divide the required denomination by the denomination of the given fraction. $3\overline{)12}$ 4

Step 2—Multiply the numerator of the given fraction by the quotient. $4\times2=8$

Step 3—Write the product over the required denominator $\frac{8}{12}$

Therefore $\frac{2}{3}=\frac{8}{12}$

Study the following examples:

	Step 1	Step 2	Step 3
$\frac{3}{4}=\frac{?}{8}$	$4\overline{)8}$ 2	$2\times3=6$	$\frac{6}{8}$
$\frac{1}{2}=\frac{?}{12}$	$2\overline{)12}$ 6	$6\times1=6$	$\frac{6}{12}$

Therefore $\frac{3}{4}=\frac{6}{8}$, $\frac{1}{2}=\frac{6}{12}$

Change to higher terms:

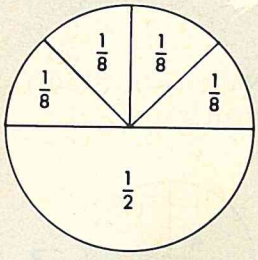
$\frac{3}{4}=\frac{?}{12}$ $\qquad$ $\frac{1}{2}=\frac{?}{8}$

$\frac{3}{5}=\frac{?}{10}$ $\qquad$ $\frac{1}{2}=\frac{?}{10}$ $\qquad$ $\frac{1}{3}=\frac{?}{12}$

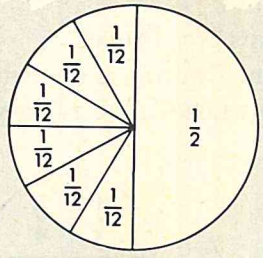
$\frac{2}{5}=\frac{?}{15}$ $\qquad$ $\frac{2}{3}=\frac{?}{9}$

LESSON 4. Reducing Fractions to Lowest Terms

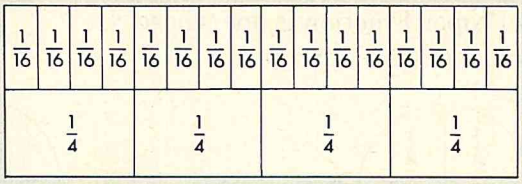
The terms of a fraction are the numerator and the denominator.



$\frac{4}{8}$ $\frac{1}{2}$



$\frac{6}{12}$ $\frac{1}{2}$



$\frac{12}{16}$ $\frac{3}{4}$

In the diagram above we see

$\frac{4}{8}=\frac{1}{2}$ $\frac{6}{12}=\frac{1}{2}$ $\frac{12}{16}=\frac{3}{4}$

A fraction can be changed from higher terms to lower terms without changing the value of the fraction.

When a fraction such as $\frac{12}{16}$ is changed to $\frac{3}{4}$ we say $\frac{12}{16}$ has been *reduced* to its lowest terms.

> A fraction is in its lowest terms when the numerator and the denominator cannot be divided by any number except "1."

To reduce a fraction to its lowest terms: Divide the numerator and the denominator by the largest number that is contained exactly in both of them.
$\frac{8}{12}=\frac{2}{3}$ Both terms of the fraction $\frac{8}{12}$ have been divided by 4.
Since $\frac{4}{4}=1$, we are really dividing both terms of the fraction by "1."

> To divide a fraction by "1" does not change the value of the fraction.

Read aloud the following fractions. Then reduce them to their lowest terms:

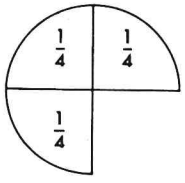
1. $\frac{4}{10}$ $\frac{8}{16}$ $\frac{2}{6}$ $\frac{3}{24}$ $\frac{12}{16}$ $\frac{8}{12}$
2. $\frac{12}{15}$ $\frac{5}{20}$ $\frac{15}{25}$ $\frac{4}{16}$ $\frac{9}{27}$ $\frac{24}{36}$
3. $\frac{9}{24}$ $\frac{10}{15}$ $\frac{12}{18}$ $\frac{8}{20}$ $\frac{18}{27}$ $\frac{12}{20}$
4. $\frac{2}{24}$ $\frac{15}{20}$ $\frac{6}{12}$ $\frac{32}{36}$ $\frac{4}{20}$ $\frac{10}{16}$
5. $\frac{27}{36}$ $\frac{16}{20}$ $\frac{10}{24}$ $\frac{3}{12}$ $\frac{8}{24}$ $\frac{6}{8}$
6. $\frac{22}{24}$ $\frac{2}{10}$ $\frac{18}{24}$ $\frac{10}{12}$ $\frac{4}{6}$ $\frac{6}{20}$
7. $\frac{15}{18}$ $\frac{6}{18}$ $\frac{10}{25}$ $\frac{8}{10}$ $\frac{4}{32}$ $\frac{3}{21}$

Which of the fractions below are already in their lowest terms? Copy the other fractions and reduce them to their lowest terms.

1. $\frac{8}{40}$ $\frac{7}{20}$ $\frac{3}{9}$ $\frac{5}{12}$ $\frac{6}{12}$ $\frac{6}{7}$
2. $\frac{4}{9}$ $\frac{3}{21}$ $\frac{11}{12}$ $\frac{11}{22}$ $\frac{6}{18}$ $\frac{8}{9}$
3. $\frac{4}{12}$ $\frac{4}{5}$ $\frac{2}{3}$ $\frac{10}{15}$ $\frac{10}{11}$ $\frac{2}{16}$
4. $\frac{7}{10}$ $\frac{4}{21}$ $\frac{2}{11}$ $\frac{15}{24}$ $\frac{7}{21}$ $\frac{5}{50}$
5. $\frac{16}{24}$ $\frac{9}{12}$ $\frac{3}{9}$ $\frac{6}{8}$ $\frac{15}{21}$ $\frac{15}{17}$
6. $\frac{6}{10}$ $\frac{4}{17}$ $\frac{12}{15}$ $\frac{7}{12}$ $\frac{28}{35}$ $\frac{14}{15}$
7. $\frac{15}{25}$ $\frac{12}{14}$ $\frac{9}{14}$ $\frac{8}{15}$ $\frac{30}{35}$ $\frac{21}{28}$
8. $\frac{4}{6}$ $\frac{10}{12}$ $\frac{9}{18}$ $\frac{3}{13}$ $\frac{9}{10}$ $\frac{24}{30}$
9. $\frac{10}{12}$ $\frac{7}{19}$ $\frac{18}{42}$ $\frac{12}{19}$ $\frac{27}{45}$ $\frac{12}{17}$
10. $\frac{10}{15}$ $\frac{15}{16}$ $\frac{20}{25}$ $\frac{17}{21}$ $\frac{49}{56}$ $\frac{32}{40}$

LESSON 5. Proper and Improper Fractions

A Proper Fraction is one whose value is less than a unit.

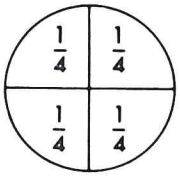


3 numerator
4 denominator

Value is less than a whole. Therefore, the numerator is less than the denominator.

*Im*proper means *Not* Proper

An Improper Fraction is one whose value is equal to a unit, or one whose value is greater than a unit.



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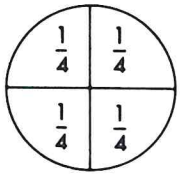
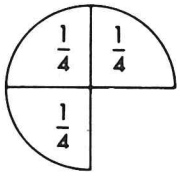
Value is one whole. Therefore, the numerator is equal to the denominator.





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Value is greater than a whole. Therefore, the numerator is greater than the denominator.

Give the answers orally:

1. The value of a proper fraction is ..?.. than a unit, so the numerator in a proper fraction is ..?.. than the denominator.

2. The value of an improper fraction is ..?.. to a unit or it is ..?.. than a unit.

3. The value of $\frac{5}{5}$ is equal to a ..?..

4. When the value of a fraction is equal to a unit, the numerator is ..?.. to the denominator.

5. The value of $\frac{7}{5}$ is ..?.. than a unit. When the value of a fraction is greater than a unit, the numerator is ..?.. than the denominator.

6. $\frac{7}{3}$ is a (proper-improper) fraction?

7. $\frac{9}{9}$ is a (proper-improper) fraction?

8. $\frac{3}{8}$ is a (proper-improper) fraction?

9. Change the following to proper fractions:

$\frac{?}{8}$ $\frac{?}{3}$ $\frac{?}{6}$ $\frac{?}{5}$ $\frac{?}{9}$ $\frac{?}{7}$

$\frac{?}{12}$ $\frac{?}{10}$ $\frac{?}{18}$ $\frac{?}{20}$ $\frac{?}{24}$ $\frac{?}{30}$

10. Change the following to improper fractions whose value is equal to a unit:

$\frac{?}{8}$ $\frac{?}{2}$ $\frac{?}{3}$ $\frac{?}{9}$ $\frac{?}{20}$ $\frac{?}{36}$

$\frac{?}{5}$ $\frac{?}{12}$ $\frac{?}{7}$ $\frac{?}{4}$ $\frac{?}{16}$ $\frac{?}{24}$

11. Change the following to improper fractions whose value is more than a unit:

$\frac{?}{9}$ $\frac{?}{8}$ $\frac{?}{5}$ $\frac{?}{10}$ $\frac{?}{20}$ $\frac{?}{30}$

$\frac{?}{24}$ $\frac{?}{36}$ $\frac{?}{18}$ $\frac{?}{15}$ $\frac{?}{12}$ $\frac{?}{16}$

12. Tell whether each of the following is a proper or an improper fraction:

$\frac{7}{7}$ $\frac{6}{7}$ $\frac{8}{7}$ $\frac{9}{10}$ $\frac{7}{10}$ $\frac{13}{10}$

$\frac{4}{5}$ $\frac{8}{9}$ $\frac{6}{6}$ $\frac{7}{12}$ $\frac{8}{5}$ $\frac{7}{3}$

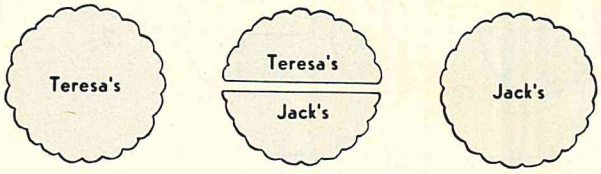
$\frac{4}{3}$ $\frac{16}{16}$ $\frac{3}{5}$ $\frac{9}{4}$ $\frac{18}{7}$ $\frac{35}{4}$

$\frac{14}{3}$ $\frac{17}{5}$ $\frac{21}{2}$ $\frac{8}{21}$ $\frac{20}{20}$ $\frac{20}{9}$

$\frac{15}{16}$ $\frac{8}{8}$ $\frac{23}{20}$ $\frac{15}{14}$ $\frac{12}{12}$ $\frac{19}{24}$

LESSON 6. Mixed Numbers

Teresa had three cakes to share with her brother Jack. What was each one's share?

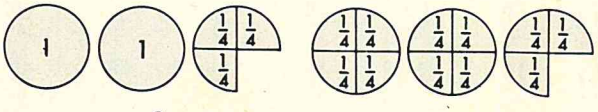


Teresa received a whole cake. Jack received a whole cake. The other cake was divided into halves, so each had a whole cake and a half of a cake.

We represent what each had by $1\frac{1}{2}$.

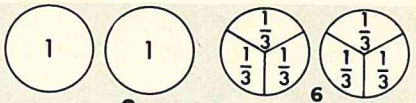
A number like $1\frac{1}{2}$ is called a mixed number because it contains a whole number and a fraction.

A mixed number such as $2\frac{3}{4}$ can be expressed as an improper fraction, as is shown in the illustration:



$2\frac{3}{4} = \frac{11}{4}$

A Whole Number may be changed to an improper fraction.



$2 = \frac{6}{3}$

In one whole there are $\frac{3}{3}$ $1 = \frac{3}{3}$

In two wholes there are $\frac{6}{3}$ $2 = \frac{6}{3}$

To change a whole number to an improper fraction such as to change **4** to **5**ths:

$4 = \frac{?}{5}$, Think: In **1** there are $\frac{5}{5}$

In **4** there are $\frac{20}{5}$ $4 = \frac{20}{5}$

A quick way is:

1. Multiply the whole number by the required denominator.
2. Write the product over this same denominator.

A quick way of changing a mixed number such as $2\frac{3}{4}$ to an improper fraction is:

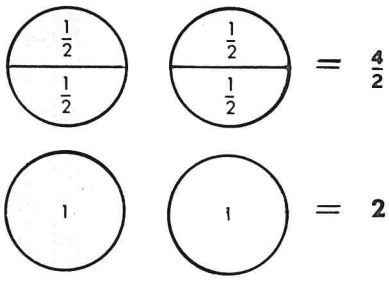
1. Multiply the whole number by the denominator.
   Four **2**'s are **8**.
2. Add the product to the numerator.
   $8 + 3 = 11$
3. Place the result over the denominator $\frac{11}{4}$

Change the following mixed numbers to improper fractions:

1.	$7\frac{5}{9}$	$8\frac{1}{2}$	$9\frac{1}{4}$	$6\frac{5}{9}$	$8\frac{5}{11}$
2.	$8\frac{4}{5}$	$6\frac{3}{8}$	$9\frac{1}{8}$	$7\frac{1}{3}$	$5\frac{2}{3}$
3.	$2\frac{5}{6}$	$5\frac{2}{9}$	$1\frac{7}{8}$	$3\frac{7}{9}$	$3\frac{5}{12}$
4.	$2\frac{5}{8}$	$9\frac{2}{3}$	$7\frac{4}{9}$	$6\frac{1}{5}$	$5\frac{7}{8}$
5.	$6\frac{3}{7}$	$2\frac{4}{5}$	$5\frac{4}{5}$	$3\frac{3}{4}$	$4\frac{5}{7}$
6.	$4\frac{5}{8}$	$3\frac{4}{9}$	$8\frac{3}{7}$	$9\frac{4}{5}$	$11\frac{1}{9}$
7.	$2\frac{3}{5}$	$6\frac{4}{5}$	$9\frac{3}{4}$	$8\frac{1}{5}$	$9\frac{3}{8}$
8.	$7\frac{1}{8}$	$9\frac{1}{3}$	$4\frac{5}{7}$	$6\frac{2}{5}$	$7\frac{3}{7}$

Change the following whole numbers to improper fractions with the required denominator:

1.	$1 = \frac{?}{5}$	$2 = \frac{?}{5}$	$3 = \frac{?}{5}$
2.	$1 = \frac{?}{6}$	$2 = \frac{?}{6}$	$5 = \frac{?}{6}$
3.	$1 = \frac{?}{8}$	$2 = \frac{?}{8}$	$4 = \frac{?}{8}$
4.	$1 = \frac{?}{12}$	$3 = \frac{?}{12}$	$5 = \frac{?}{12}$
5.	$9 = \frac{?}{3}$	$7 = \frac{?}{5}$	$6 = \frac{?}{9}$
6.	$9 = \frac{?}{8}$	$10 = \frac{?}{2}$	$12 = \frac{?}{3}$
7.	$1 = \frac{?}{4}$	$2 = \frac{?}{4}$	$3 = \frac{?}{4}$
8.	$1 = \frac{?}{9}$	$9 = \frac{?}{5}$	$8 = \frac{?}{3}$
9.	$\frac{?}{3} = 10$	$\frac{?}{7} = 9$	$\frac{?}{5} = 3$
10.	$\frac{?}{7} = 1$	$\frac{?}{8} = 6$	$\frac{?}{5} = 4$

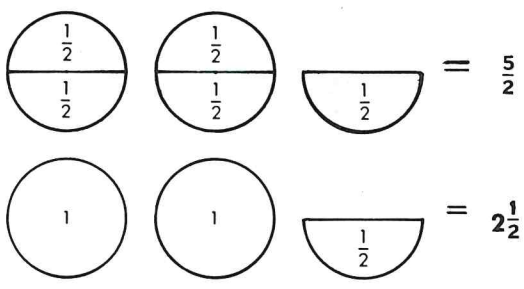


This shows us that $\frac{4}{2} = 2$

When we change $\frac{4}{2}$ to **2**, we are changing an improper fraction to a whole number.

To change an improper fraction to a whole number,
divide
the numerator by the denominator

$\frac{4}{2} = 2$, $\frac{12}{3} = 4$, $\frac{16}{8} = 2$, $\frac{20}{5} = 4$



This shows us that $\frac{5}{2} = 2\frac{1}{2}$

When we change $\frac{5}{2}$ to $2\frac{1}{2}$, we are changing an improper fraction to a mixed number.

To change an improper fraction such as $\frac{17}{3}$ to a mixed number,
divide
the numerator by the denominator $\frac{17}{3} = 3\overline{)17}\ 5\frac{2}{3}$
Write the remainder over the denominator.

LESSON 7. Changing Improper Fractions to Whole or to Mixed Numb

Change to whole numbers:

1.	$\frac{8}{8}$	$\frac{7}{7}$	$\frac{5}{5}$	$\frac{20}{10}$	$\frac{40}{5}$
2.	$\frac{27}{3}$	$\frac{40}{8}$	$\frac{24}{3}$	$\frac{28}{4}$	$\frac{54}{9}$
3.	$\frac{56}{7}$	$\frac{32}{4}$	$\frac{64}{8}$	$\frac{21}{7}$	$\frac{36}{9}$
4.	$\frac{36}{6}$	$\frac{27}{9}$	$\frac{49}{7}$	$\frac{24}{4}$	$\frac{36}{6}$

Change to mixed numbers:

1.	$\frac{5}{4}$	$\frac{3}{2}$	$\frac{11}{4}$	$\frac{46}{5}$	$\frac{36}{5}$	$\frac{5}{3}$
2.	$\frac{42}{5}$	$\frac{37}{4}$	$\frac{15}{8}$	$\frac{8}{3}$	$\frac{7}{6}$	$\frac{27}{5}$
3.	$\frac{10}{3}$	$\frac{13}{6}$	$\frac{19}{9}$	$\frac{16}{7}$	$\frac{41}{8}$	$\frac{34}{9}$
4.	$\frac{43}{5}$	$\frac{17}{4}$	$\frac{26}{5}$	$\frac{7}{2}$	$\frac{29}{9}$	$\frac{35}{8}$
5.	$\frac{4}{3}$	$\frac{37}{5}$	$\frac{51}{7}$	$\frac{67}{8}$	$\frac{11}{2}$	$\frac{7}{3}$
6.	$\frac{11}{3}$	$\frac{15}{4}$	$\frac{49}{9}$	$\frac{37}{8}$	$\frac{29}{7}$	$\frac{5}{2}$
7.	$\frac{8}{5}$	$\frac{13}{8}$	$\frac{59}{8}$	$\frac{31}{7}$	$\frac{9}{2}$	$\frac{8}{3}$
8.	$\frac{13}{5}$	$\frac{10}{4}$	$\frac{12}{8}$	$\frac{14}{10}$	$\frac{12}{9}$	$\frac{14}{4}$
9.	$\frac{15}{6}$	$\frac{50}{8}$	$\frac{39}{5}$	$\frac{38}{8}$	$\frac{42}{8}$	$\frac{30}{4}$
10.	$\frac{13}{2}$	$\frac{54}{8}$	$\frac{46}{6}$	$\frac{26}{4}$	$\frac{88}{10}$	$\frac{40}{6}$

Change to whole or to mixed numbers:

1.	$\frac{17}{5}$	$\frac{20}{7}$	$\frac{11}{6}$	$\frac{20}{5}$	$\frac{37}{7}$	$\frac{13}{3}$
2.	$\frac{7}{4}$	$\frac{14}{3}$	$\frac{38}{5}$	$\frac{13}{8}$	$\frac{40}{8}$	$\frac{8}{4}$
3.	$\frac{12}{2}$	$\frac{18}{3}$	$\frac{16}{16}$	$\frac{65}{8}$	$\frac{17}{8}$	$\frac{24}{8}$
4.	$\frac{11}{3}$	$\frac{52}{5}$	$\frac{54}{6}$	$\frac{36}{4}$	$\frac{16}{3}$	$\frac{13}{4}$
5.	$\frac{10}{9}$	$\frac{21}{3}$	$\frac{44}{7}$	$\frac{21}{8}$	$\frac{36}{6}$	$\frac{29}{9}$
6.	$\frac{16}{8}$	$\frac{9}{9}$	$\frac{96}{8}$	$\frac{18}{8}$	$\frac{67}{7}$	$\frac{59}{8}$
7.	$\frac{31}{5}$	$\frac{58}{7}$	$\frac{31}{9}$	$\frac{10}{6}$	$\frac{40}{4}$	$\frac{38}{4}$
8.	$\frac{18}{6}$	$\frac{23}{8}$	$\frac{47}{9}$	$\frac{19}{4}$	$\frac{52}{8}$	$\frac{45}{6}$
9.	$\frac{17}{3}$	$\frac{48}{6}$	$\frac{6}{4}$	$\frac{50}{6}$	$\frac{42}{10}$	$\frac{30}{8}$
10.	$\frac{65}{7}$	$\frac{45}{8}$	$\frac{22}{4}$	$\frac{54}{10}$	$\frac{210}{8}$	$\frac{10}{6}$

LESSON 8. Introducing Addition of Fractions

Things can be added if they have the same name:

3 eggs	8 pencils	3 fifths
4 eggs	5 pencils	1 fifth
7 eggs	13 pencils	4 fifths

Fractions, too, have names. The denominator of a fraction tells its name.

Fractions that have *like* denominators have the same name.

$\frac{2}{9}$ and $\frac{5}{9}$ have the same name, because they have *like* denominators. When fractions have *like* denominators, we say they have a *common* denominator.

Add $\frac{2}{9}$ and $\frac{5}{9}$

$$\begin{array}{r} \frac{2}{9} \\ +\ \frac{5}{9} \\ \hline \frac{7}{9} \end{array}$$

To add fractions:
Add the numerators.
Write their sum over the common denominator.

Add:

1. $\frac{4}{12}+\frac{1}{12}$ $\quad \frac{4}{10}+\frac{5}{10}$ $\quad \frac{3}{5}+\frac{1}{5}$
2. $\frac{2}{12}+\frac{3}{12}$ $\quad \frac{7}{9}+\frac{1}{9}$ $\quad \frac{3}{7}+\frac{3}{7}$
3. $\frac{2}{9}+\frac{2}{9}$ $\quad \frac{3}{7}+\frac{2}{7}$ $\quad \frac{4}{13}+\frac{3}{13}$
4. $\frac{5}{9}+\frac{2}{9}$ $\quad \frac{6}{11}+\frac{4}{11}$ $\quad \frac{5}{17}+\frac{3}{17}$
5. $\frac{2}{5}+\frac{2}{5}$ $\quad \frac{4}{9}+\frac{1}{9}$ $\quad \frac{4}{7}+\frac{1}{7}$
6. $\frac{5}{11}+\frac{3}{11}$ $\quad \frac{5}{13}+\frac{3}{13}$ $\quad \frac{7}{11}+\frac{2}{11}$
7. $\frac{3}{13}+\frac{2}{13}$ $\quad \frac{5}{16}+\frac{2}{16}$ $\quad \frac{4}{19}+\frac{6}{19}$
8. $\frac{2}{17}+\frac{5}{17}$ $\quad \frac{2}{13}+\frac{4}{13}$ $\quad \frac{7}{16}+\frac{4}{16}$
9. $\frac{4}{19}+\frac{1}{19}$ $\quad \frac{4}{21}+\frac{1}{21}$ $\quad \frac{4}{30}+\frac{3}{30}$
10. $\frac{5}{23}+\frac{3}{23}$ $\quad \frac{8}{21}+\frac{2}{21}$ $\quad \frac{5}{14}+\frac{4}{14}$
11. $\frac{3}{24}+\frac{4}{24}$ $\quad \frac{8}{20}+\frac{5}{20}$ $\quad \frac{2}{9}+\frac{5}{9}$
12. $\frac{3}{8}+\frac{2}{8}$ $\quad \frac{2}{15}+\frac{11}{15}$ $\quad \frac{4}{10}+\frac{3}{10}$
13. $\frac{5}{21}+\frac{6}{21}$ $\quad \frac{6}{18}+\frac{1}{18}$ $\quad \frac{3}{11}+\frac{6}{11}$

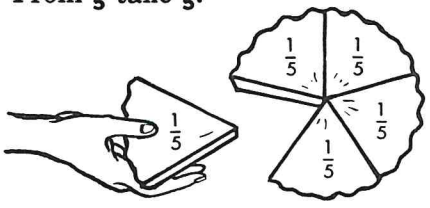
Add:

1.	$\frac{2}{15}$	$\frac{6}{13}$	$\frac{2}{14}$	$\frac{6}{12}$	$\frac{2}{11}$
	$\frac{11}{15}$	$\frac{3}{13}$	$\frac{3}{14}$	$\frac{5}{12}$	$\frac{1}{11}$
2.	$\frac{4}{19}$	$\frac{2}{11}$	$\frac{5}{15}$	$\frac{1}{4}$	$\frac{4}{9}$
	$\frac{3}{19}$	$\frac{3}{11}$	$\frac{2}{15}$	$\frac{2}{4}$	$\frac{3}{9}$
3.	$\frac{2}{9}$	$\frac{5}{12}$	$\frac{4}{7}$	$\frac{5}{13}$	$\frac{1}{10}$
	$\frac{3}{9}$	$\frac{2}{12}$	$\frac{2}{7}$	$\frac{1}{13}$	$\frac{6}{10}$
4.	$\frac{4}{9}$	$\frac{6}{13}$	$\frac{2}{6}$	$\frac{4}{11}$	$\frac{3}{11}$
	$\frac{3}{9}$	$\frac{4}{13}$	$\frac{3}{6}$	$\frac{3}{11}$	$\frac{7}{11}$
5.	$\frac{1}{5}$	$\frac{3}{8}$	$\frac{4}{17}$	$\frac{9}{12}$	$\frac{3}{9}$
	$\frac{2}{5}$	$\frac{4}{8}$	$\frac{1}{17}$	$\frac{2}{12}$	$\frac{1}{9}$
6.	$\frac{5}{8}$	$\frac{4}{12}$	$\frac{5}{10}$	$\frac{4}{6}$	$\frac{4}{9}$
	$\frac{2}{8}$	$\frac{3}{12}$	$\frac{2}{10}$	$\frac{1}{6}$	$\frac{3}{9}$
7.	$\frac{3}{24}$	$\frac{8}{21}$	$\frac{9}{16}$	$\frac{3}{20}$	$\frac{7}{19}$
	$\frac{8}{24}$	$\frac{3}{21}$	$\frac{4}{16}$	$\frac{6}{20}$	$\frac{5}{19}$

7 cents	7 ninths	4 apples	4 sevenths
−2 cents	−2 ninths	−4 apples	−4 sevenths
5 cents	5 ninths	0	0

LESSON 9. Introducing Subtraction of Fractions

From $\frac{5}{5}$ take $\frac{1}{5}$.



Here we see $\frac{5}{5}$ or a whole pie.
Take $\frac{1}{5}$ away.
How many fifths are left?

$$\begin{array}{r} \frac{5}{5} \\ -\frac{1}{5} \\ \hline \frac{4}{5} \end{array}$$

1. Subtract the numerators: 1 from 5 leaves 4.
2. Write the 4 over the common denominator 5. The answer is $\frac{4}{5}$.

Subtract:

1.	$\frac{7}{9}$	$\frac{3}{4}$	$\frac{4}{5}$	$\frac{5}{9}$	$\frac{5}{7}$
	$\frac{5}{9}$	$\frac{2}{4}$	$\frac{2}{5}$	$\frac{3}{9}$	$\frac{3}{7}$
2.	$\frac{5}{8}$	$\frac{6}{8}$	$\frac{7}{9}$	$\frac{3}{6}$	$\frac{5}{6}$
	$\frac{2}{8}$	$\frac{3}{8}$	$\frac{3}{9}$	$\frac{2}{6}$	$\frac{4}{6}$
3.	$\frac{7}{10}$	$\frac{10}{11}$	$\frac{7}{8}$	$\frac{6}{7}$	$\frac{8}{9}$
	$\frac{6}{10}$	$\frac{7}{11}$	$\frac{6}{8}$	$\frac{2}{7}$	$\frac{6}{9}$
4.	$\frac{5}{7}$	$\frac{4}{5}$	$\frac{3}{5}$	$\frac{7}{9}$	$\frac{4}{15}$
	$\frac{2}{7}$	$\frac{3}{5}$	$\frac{1}{5}$	$\frac{5}{9}$	$\frac{3}{15}$
5.	$\frac{5}{11}$	$\frac{6}{17}$	$\frac{11}{13}$	$\frac{2}{3}$	$\frac{8}{14}$
	$\frac{2}{11}$	$\frac{2}{17}$	$\frac{5}{13}$	$\frac{1}{3}$	$\frac{3}{14}$
6.	$\frac{4}{7}$	$\frac{7}{8}$	$\frac{9}{17}$	$\frac{6}{8}$	$\frac{5}{6}$
	$\frac{3}{7}$	$\frac{4}{8}$	$\frac{4}{17}$	$\frac{3}{8}$	$\frac{4}{6}$
7.	$\frac{8}{12}$	$\frac{10}{19}$	$\frac{3}{5}$	$\frac{6}{13}$	$\frac{13}{18}$
	$\frac{1}{12}$	$\frac{3}{19}$	$\frac{1}{5}$	$\frac{4}{13}$	$\frac{6}{18}$

Solve the following problems:

1. Jim saw $\frac{5}{8}$ of a pie in the pantry. He ate $\frac{2}{8}$. How many eighths were left?
2. Nancy made a poster for the history class. She used $\frac{4}{7}$ of a yard of blue tape and $\frac{2}{7}$ of a yard of red tape. How many sevenths did she use?
3. Jane had $\frac{3}{8}$ of a pound of candy, and Peggy had $\frac{5}{8}$ of a pound. How many more eighths had Peggy than Jane?
4. Frank's mother had $\frac{7}{12}$ of a pound of butter. If she used $\frac{5}{12}$ of a pound, how many twelfths had she left?
5. Ned had $\frac{9}{10}$ of a dollar. He spent $\frac{3}{10}$ of a dollar for a kite. How many tenths had he left?
6. Betty practices $\frac{4}{5}$ of an hour each day. Alice practices $\frac{3}{5}$ of an hour. How many more fifths does Betty practice than Alice?
7. Eileen colored two-sevenths of her poster red and then four-sevenths blue. How many more sevenths were blue than red?
8. Martin had four-fifths of the fence to paint. His friend offered to paint one-fifth. How many fifths did Martin paint?

Addition

Add: $\frac{3}{8}$ and $\frac{1}{8}$

$$\begin{array}{r} \frac{3}{8} \\ +\frac{1}{8} \\ \hline \frac{4}{8} = \frac{1}{2} \end{array}$$

Subtraction

Subtract: From $\frac{7}{12}$ take $\frac{3}{12}$

$$\begin{array}{r} \frac{7}{12} \\ \frac{3}{12} \\ \hline \frac{4}{12} = \frac{1}{3} \end{array}$$

Reduction

$$\frac{6}{12} = \frac{1}{2}$$

To reduce a proper fraction to its lowest terms, divide the numerator and the denominator by the same number.

$6 \div 6 = 1$
$12 \div 6 = 2$

LESSON 10. Addition and Subtraction With Reduction

Reduce the fraction in the answer to lowest terms.

1.	$\frac{2}{6}+\frac{2}{6}$	$\frac{3}{8}+\frac{1}{8}$	$\frac{3}{8}+\frac{3}{8}$
2.	$\frac{5}{14}+\frac{3}{14}$	$\frac{2}{10}+\frac{2}{10}$	$\frac{4}{14}+\frac{2}{14}$
3.	$\frac{5}{12}+\frac{4}{12}$	$\frac{6}{15}+\frac{3}{15}$	$\frac{6}{14}+\frac{1}{14}$
4.	$\frac{5}{15}+\frac{4}{15}$	$\frac{7}{15}+\frac{2}{15}$	$\frac{6}{10}+\frac{2}{10}$
5.	$\frac{9}{10}-\frac{7}{10}$	$\frac{8}{15}-\frac{3}{15}$	$\frac{9}{16}-\frac{7}{16}$
6.	$\frac{11}{12}-\frac{3}{12}$	$\frac{6}{12}-\frac{4}{12}$	$\frac{7}{16}-\frac{3}{16}$
7.	$\frac{9}{12}-\frac{1}{12}$	$\frac{9}{15}-\frac{4}{15}$	$\frac{6}{12}-\frac{3}{12}$
8.	$\frac{6}{18}-\frac{4}{18}$	$\frac{6}{16}+\frac{4}{16}$	$\frac{9}{16}-\frac{3}{16}$
9.	$\frac{4}{12}+\frac{2}{12}$	$\frac{3}{16}-\frac{1}{16}$	$\frac{3}{10}+\frac{3}{10}$
10.	$\frac{5}{14}-\frac{1}{14}$	$\frac{6}{14}+\frac{2}{14}$	$\frac{6}{12}-\frac{2}{12}$
11.	$\frac{8}{16}+\frac{2}{16}$	$\frac{9}{15}-\frac{3}{15}$	$\frac{5}{10}+\frac{3}{10}$
12.	$\frac{5}{14}+\frac{2}{14}$	$\frac{6}{18}-\frac{3}{18}$	$\frac{2}{16}+\frac{2}{16}$
13.	$\frac{17}{20}-\frac{1}{20}$	$\frac{7}{12}+\frac{3}{12}$	$\frac{7}{15}-\frac{4}{15}$
14.	$\frac{20}{30}+\frac{5}{30}$	$\frac{10}{12}-\frac{4}{12}$	$\frac{9}{24}+\frac{3}{24}$
15.	$\frac{6}{10}+\frac{2}{10}$	$\frac{9}{21}-\frac{6}{21}$	$\frac{8}{15}+\frac{1}{15}$
16.	$\frac{6}{16}-\frac{2}{16}$	$\frac{4}{25}+\frac{6}{25}$	$\frac{5}{12}-\frac{3}{12}$
17.	$\frac{1}{4}+\frac{1}{4}$	$\frac{5}{9}-\frac{2}{9}$	$\frac{2}{10}+\frac{3}{10}$
18.	$\frac{1}{16}+\frac{1}{16}$	$\frac{4}{15}+\frac{1}{15}$	$\frac{5}{24}+\frac{3}{24}$
19.	$\frac{3}{10}-\frac{1}{10}$	$\frac{3}{14}+\frac{4}{14}$	$\frac{5}{12}-\frac{1}{12}$
20.	$\frac{5}{8}+\frac{1}{8}$	$\frac{8}{16}-\frac{4}{16}$	$\frac{5}{6}-\frac{2}{6}$
21.	$\frac{12}{20}-\frac{7}{20}$	$\frac{3}{8}+\frac{3}{8}$	$\frac{11}{12}-\frac{2}{12}$
22.	$\frac{7}{18}+\frac{1}{18}$	$\frac{7}{16}-\frac{1}{16}$	$\frac{12}{30}-\frac{2}{30}$

Practice With Problems

1. What is the sum of $\frac{2}{4}$ and $\frac{1}{4}$?

2. When we add $\frac{4}{6}$ and $\frac{1}{6}$ the answer is?

3. How much is $\frac{3}{8}$ and $\frac{1}{8}$?

4. How much more than $\frac{2}{9}$ is $\frac{5}{9}$?

5. How much less than $\frac{6}{7}$ is $\frac{3}{7}$?

6. How much larger than $\frac{1}{6}$ of a pie is $\frac{5}{6}$ of a pie?

7. How much smaller than $\frac{5}{8}$ of a pie is $\frac{3}{8}$ of a pie?

8. John read $\frac{1}{5}$ of his new story book on Monday, and $\frac{2}{5}$ on Tuesday. What part of his book did he read in the two days?

9. Helen used $\frac{3}{8}$ of a yard of ribbon to make her blue bow and $\frac{5}{8}$ of a yard to make her red bow. What fraction shows how much ribbon she used to make both bows?

10. Jean found $\frac{7}{8}$ of a pie on the plate. If she ate $\frac{2}{8}$, what part of the pie was left?

11. Alice walked $\frac{1}{3}$ of a mile to church and $\frac{1}{3}$ of a mile farther to school. How far did she walk altogether?

12. Charles ate $\frac{1}{2}$ of an orange for breakfast and $\frac{1}{2}$ of an orange for lunch. He ate whole orange for the two meals.

13. On Saturday James worked $\frac{1}{4}$ of an hour shoveling snow, $\frac{1}{4}$ of an hour cleaning the basement and $\frac{1}{4}$ of an hour doing errands. How long did he work in all?

14. Richard bought 2 pieces of butter each weighing $\frac{1}{2}$ lb. How much did the two pieces weigh together?

15. Mary Ellen bought $\frac{3}{4}$ of a yard of lace. She used $\frac{2}{4}$ of a yard to trim her doll's dress. How much had she left?

16. Mother had $\frac{11}{12}$ of a yard of ribbon. She cut off a piece $\frac{5}{12}$ of a yard long. How much ribbon was left?

17. From $\frac{7}{8}$ of a lb. of meat, a piece weighing $\frac{3}{8}$ of a lb. was cut. What part of a lb. was left?

18. Francis rode $\frac{1}{5}$ of a mile on his bicycle one day, $\frac{1}{5}$ of a mile another day, and $\frac{3}{5}$ of a mile the third day. How many miles did he ride on the three days?

19. Mary has $\frac{3}{6}$ of a yard of blue ribbon and $\frac{3}{6}$ of a yard of white ribbon. How many yards of ribbon has Mary in both pieces?

20. Robert needs $\frac{5}{8}$ ft. of wire to finish wiring his chicken house. He has only $\frac{3}{8}$ ft. How much wire must he buy?

21. Nancy's mother bought 1 lb. of candy. If she gives $\frac{1}{3}$ of a lb. to Nancy, how much is left for the others in the family?

22. Sarah bought $\frac{3}{4}$ of a yard of silver chain. Anne bought $\frac{1}{4}$ yd. less than this. What part of a yard did Anne buy?

LESSON 11. Addition of Fractions

Add $\frac{2}{9}$ and $\frac{7}{9}$.

$$\begin{array}{r} \frac{2}{9} \\ +\frac{7}{9} \\ \hline \frac{9}{9}=1 \end{array}$$

1. Add the numerators
2. Write the sum over the common denominator.
3. Change the fraction to a whole number by dividing the numerator and the denominator by 9.

Add:

1.	$\frac{4}{5}+\frac{1}{5}$	$\frac{6}{9}+\frac{3}{9}$	$\frac{2}{4}+\frac{2}{4}$
2.	$\frac{9}{11}+\frac{2}{11}$	$\frac{4}{6}+\frac{2}{6}$	$\frac{8}{10}+\frac{2}{10}$
3.	$\frac{4}{13}+\frac{9}{13}$	$\frac{8}{12}+\frac{4}{12}$	$\frac{5}{7}+\frac{2}{7}$
4.	$\frac{4}{11}+\frac{7}{11}$	$\frac{3}{6}+\frac{3}{6}$	$\frac{5}{13}+\frac{8}{13}$
5.	$\frac{8}{14}+\frac{6}{14}$	$\frac{6}{12}+\frac{6}{12}$	$\frac{8}{16}+\frac{8}{16}$
6.	$\frac{4}{8}+\frac{4}{8}$	$\frac{3}{8}+\frac{5}{8}$	$\frac{9}{14}+\frac{5}{14}$
7.	$\frac{10}{18}+\frac{8}{18}$	$\frac{10}{17}+\frac{7}{17}$	$\frac{6}{10}+\frac{4}{10}$
8.	$\frac{9}{18}+\frac{9}{18}$	$\frac{18}{19}+\frac{1}{19}$	$\frac{1}{8}+\frac{7}{8}$
9.	$\frac{9}{16}+\frac{7}{16}$	$\frac{15}{17}+\frac{2}{17}$	$\frac{9}{15}+\frac{6}{15}$
10.	$\frac{3}{10}+\frac{7}{10}$	$\frac{7}{12}+\frac{5}{12}$	$\frac{9}{10}+\frac{1}{10}$

Give the answers orally:

1. 3 fifths + 1 fifth = 4 ?
2. 4 ninths + 3 ninths = 7 ?
3. 3 sevenths + 2 sevenths = 5 ?
4. 5 elevenths + 4 elevenths = 9 ?
5. 3 eighths + 2 eighths = 5 ?

In your notebook, arrange the following in the proper columns as shown in the example.

Whole Number	Mixed Number	Proper Fraction	Improper Fraction
2	$3\frac{1}{5}$	$\frac{4}{5}$	$\frac{8}{5}$

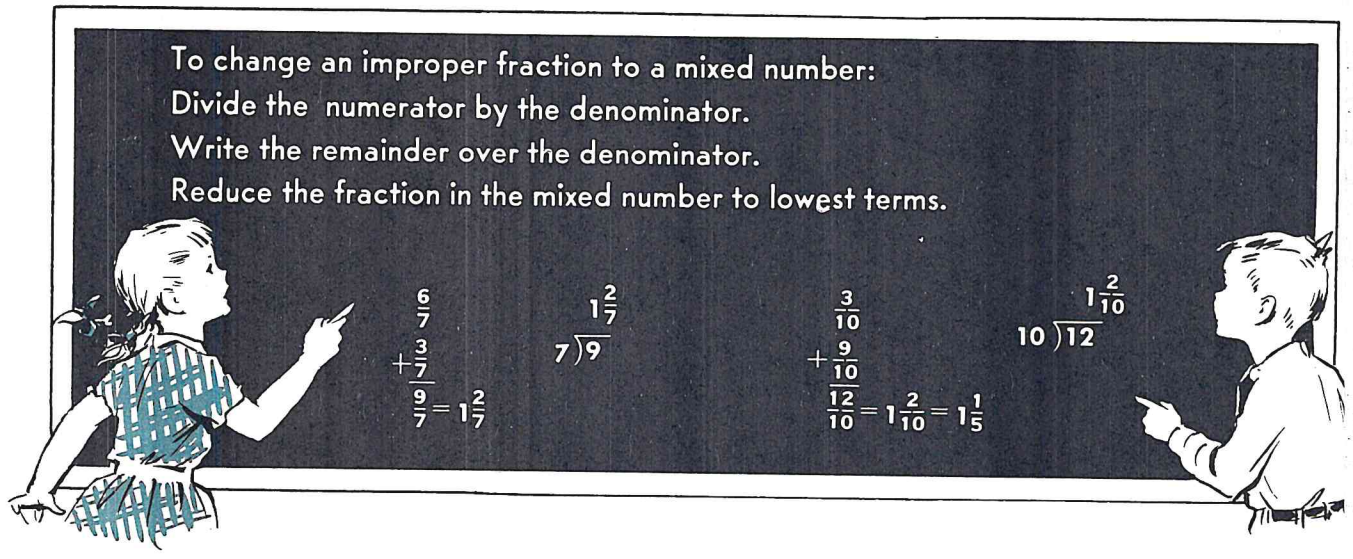
$2\frac{1}{3}$	5	$\frac{12}{11}$	$\frac{10}{10}$	$\frac{5}{8}$	$3\frac{1}{2}$	$\frac{7}{9}$	72
$7\frac{2}{10}$	$\frac{4}{9}$	$\frac{9}{8}$	$\frac{6}{12}$	$\frac{4}{4}$	$\frac{3}{4}$	$1\frac{2}{3}$	$8\frac{5}{6}$
9	21	$\frac{9}{9}$	$\frac{12}{7}$	$\frac{5}{12}$	7	$82\frac{1}{2}$	$9\frac{1}{2}$
$4\frac{2}{5}$	$\frac{7}{7}$	$\frac{15}{9}$	$\frac{11}{12}$	6	$\frac{12}{13}$	18	4

Answer the following:

1. What is a mixed number?
2. What is a proper fraction?
3. What is an improper fraction?
4. What does the numerator of a fraction tell?
5. What does the denominator of a fraction tell?
6. Change $\frac{6}{3}$ to a whole number?

Give the answers orally:

1. $\frac{3}{7}$ is a (?) fraction.
2. $\frac{10}{4}$ is an (?) fraction.
3. $4\frac{2}{5}$ is a (?) (?).
4. In the fraction $\frac{5}{8}$, 8 is the (?) and 5 is the (?).



More Addition of Fractions

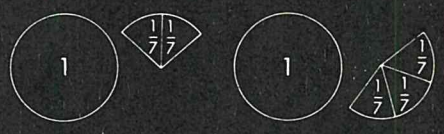
Add and give the answer in a mixed number:

1.	$\frac{3}{4}+\frac{2}{4}$	$\frac{4}{6}+\frac{3}{6}$	$\frac{4}{5}+\frac{2}{5}$
2.	$\frac{5}{9}+\frac{5}{9}$	$\frac{4}{5}+\frac{4}{5}$	$\frac{3}{7}+\frac{5}{7}$
3.	$\frac{7}{11}+\frac{7}{11}$	$\frac{6}{7}+\frac{3}{7}$	$\frac{7}{8}+\frac{4}{8}$
4.	$\frac{8}{11}+\frac{5}{11}$	$\frac{9}{10}+\frac{4}{10}$	$\frac{6}{9}+\frac{4}{9}$
5.	$\frac{8}{13}+\frac{7}{13}$	$\frac{8}{14}+\frac{9}{14}$	$\frac{7}{11}+\frac{6}{11}$
6.	$\frac{10}{12}+\frac{7}{12}$	$\frac{5}{7}+\frac{4}{7}$	$\frac{8}{11}+\frac{6}{11}$
7.	$\frac{4}{7}+\frac{4}{7}$	$\frac{11}{14}+\frac{8}{14}$	$\frac{5}{7}+\frac{5}{7}$
8.	$\frac{10}{15}+\frac{9}{15}$	$\frac{7}{8}+\frac{6}{8}$	$\frac{9}{11}+\frac{5}{11}$
9.	$\frac{10}{14}+\frac{7}{14}$	$\frac{8}{10}+\frac{5}{10}$	$\frac{9}{13}+\frac{6}{13}$
10.	$\frac{2}{7}+\frac{6}{7}$	$\frac{10}{14}+\frac{9}{14}$	$\frac{9}{11}+\frac{6}{11}$
11.	$\frac{8}{12}+\frac{9}{12}+\frac{2}{12}$		$\frac{5}{9}+\frac{8}{9}+\frac{7}{9}$
12.	$\frac{5}{10}+\frac{9}{10}+\frac{7}{10}$		$\frac{4}{16}+\frac{9}{16}+\frac{8}{16}$

Add and reduce the fraction to lowest terms

1.	$\frac{5}{6}+\frac{3}{6}$	$\frac{9}{12}+\frac{5}{12}$	$\frac{9}{10}+\frac{5}{10}$
2.	$\frac{4}{6}+\frac{4}{6}$	$\frac{6}{8}+\frac{4}{8}$	$\frac{6}{8}+\frac{6}{8}$
3.	$\frac{10}{14}+\frac{8}{14}$	$\frac{10}{15}+\frac{8}{15}$	$\frac{8}{10}+\frac{4}{10}$
4.	$\frac{9}{14}+\frac{7}{14}$	$\frac{11}{15}+\frac{9}{15}$	$\frac{7}{10}+\frac{7}{10}$
5.	$\frac{8}{10}+\frac{6}{10}$	$\frac{9}{12}+\frac{9}{12}$	$\frac{7}{8}+\frac{7}{8}$
6.	$\frac{9}{14}+\frac{9}{14}$	$\frac{6}{9}+\frac{6}{9}$	$\frac{12}{15}+\frac{6}{15}$
7.	$\frac{8}{14}+\frac{8}{14}$	$\frac{13}{15}+\frac{12}{15}$	$\frac{12}{16}+\frac{6}{16}$
8.	$\frac{10}{20}+\frac{14}{20}$	$\frac{9}{16}+\frac{9}{16}$	$\frac{14}{16}+\frac{10}{16}$
9.	$\frac{4}{12}+\frac{8}{12}+\frac{6}{12}$		$\frac{8}{15}+\frac{7}{15}+\frac{5}{15}$
10.	$\frac{5}{10}+\frac{4}{10}+\frac{3}{10}$		$\frac{8}{15}+\frac{7}{15}+\frac{10}{15}$
11.	$\frac{2}{10}+\frac{7}{10}+\frac{6}{10}$		$\frac{7}{8}+\frac{2}{8}+\frac{5}{8}$
12.	$\frac{6}{9}+\frac{7}{9}+\frac{8}{9}+$		$\frac{6}{12}+\frac{9}{12}+\frac{11}{12}$

Add $1\frac{2}{7}$ and $1\frac{3}{7}$



$1\frac{2}{7}+1\frac{3}{7}=2\frac{5}{7}$

1. Add the fractions
2. Add the whole numbers

$$\begin{array}{r} 1\frac{2}{7} \\ +1\frac{3}{7} \\ \hline 2\frac{5}{7} \end{array}$$

From $2\frac{7}{9}$ take $1\frac{2}{9}$

$$\begin{array}{r} 2\frac{7}{9} \\ -1\frac{2}{9} \\ \hline 1\frac{5}{9} \end{array}$$

When we take $1\frac{2}{9}$ from $2\frac{7}{9}$ the remainder is $1\frac{5}{9}$.

1. Subtract the fractions.
2. Subtract the whole numbers.

LESSON 12. Addition and Subtraction of Mixed Numbers (Like Denominators)

Add:

1.	$2\frac{1}{5}$	$7\frac{3}{8}$	$4\frac{2}{11}$	6	4
	$4\frac{2}{5}$	$2\frac{2}{8}$	$3\frac{5}{11}$	$2\frac{1}{8}$	$3\frac{3}{8}$
2.	$4\frac{3}{7}$	$4\frac{1}{10}$	$3\frac{2}{9}$	$4\frac{2}{13}$	3
	5	$2\frac{2}{10}$	$7\frac{5}{9}$	$5\frac{3}{13}$	$4\frac{2}{5}$
3.	$3\frac{1}{3}$	4	$3\frac{1}{9}$	$2\frac{1}{7}$	$1\frac{1}{5}$
	8	$6\frac{2}{5}$	$4\frac{4}{9}$	$3\frac{3}{7}$	$4\frac{2}{5}$
4.	$2\frac{3}{15}$	$1\frac{3}{11}$	$4\frac{1}{4}$	$3\frac{1}{5}$	$4\frac{1}{7}$
	5	$7\frac{2}{11}$	9	$\frac{1}{5}$	$9\frac{1}{7}$
	$8\frac{4}{15}$	8	$3\frac{2}{4}$	$\frac{2}{5}$	$2\frac{2}{7}$
5.	$\frac{2}{9}$	$\frac{1}{8}$	$4\frac{2}{11}$	$9\frac{2}{13}$	$3\frac{2}{9}$
	$3\frac{4}{9}$	$9\frac{1}{8}$	$3\frac{1}{11}$	$5\frac{1}{13}$	$1\frac{1}{9}$
	$\frac{1}{9}$	$\frac{3}{8}$	8	$8\frac{3}{13}$	$6\frac{4}{9}$

Subtract:

1.	$6\frac{4}{7}$	$5\frac{7}{9}$	$4\frac{3}{11}$	$6\frac{7}{13}$	$5\frac{15}{17}$
	$2\frac{1}{7}$	$3\frac{2}{9}$	$2\frac{1}{11}$	$4\frac{2}{13}$	$2\frac{4}{17}$
2.	$3\frac{4}{5}$	$4\frac{2}{3}$	$3\frac{14}{19}$	$7\frac{16}{20}$	$5\frac{5}{7}$
	$2\frac{2}{5}$	$2\frac{1}{3}$	$2\frac{6}{19}$	$3\frac{7}{20}$	$3\frac{3}{7}$
3.	$3\frac{3}{4}$	$6\frac{5}{9}$	$15\frac{19}{20}$	$7\frac{4}{9}$	$16\frac{11}{14}$
	$1\frac{2}{4}$	$4\frac{4}{9}$	$4\frac{8}{20}$	$4\frac{2}{9}$	$3\frac{2}{14}$
4.	$14\frac{4}{15}$	$5\frac{4}{8}$	$9\frac{9}{10}$	$12\frac{6}{7}$	$9\frac{4}{5}$
	$6\frac{2}{15}$	$2\frac{3}{8}$	$4\frac{2}{10}$	$9\frac{1}{7}$	$2\frac{1}{5}$
5.	$6\frac{5}{9}$	$8\frac{4}{11}$	$6\frac{4}{17}$	$4\frac{8}{15}$	$15\frac{7}{20}$
	$2\frac{3}{9}$	$5\frac{2}{11}$	$5\frac{1}{17}$	$2\frac{1}{15}$	$9\frac{4}{20}$
6.	$21\frac{8}{14}$	$17\frac{8}{9}$	$14\frac{7}{11}$	$13\frac{5}{19}$	$18\frac{5}{7}$
	$7\frac{3}{14}$	$6\frac{4}{9}$	$8\frac{2}{11}$	$7\frac{2}{19}$	$7\frac{2}{7}$

Adding and Subtracting Mixed Numbers

Add $3\frac{1}{6}$ and $2\frac{1}{6}$

1. Add the fractions.
2. Add the whole numbers.
3. Bring over the whole number and the fraction reduced to its lowest terms.

$$\begin{array}{r} 3\frac{1}{6} \\ +2\frac{1}{6} \\ \hline 5\frac{2}{6} = \end{array}$$

Watch your signs.

1.	$4\frac{1}{6}$ $+5\frac{1}{6}$	$9\frac{3}{8}$ $+6\frac{1}{8}$	$4\frac{2}{9}$ $+5\frac{4}{9}$	$8\frac{1}{9}$ $+4\frac{2}{9}$
2.	$7\frac{4}{9}$ $-2\frac{1}{9}$	$8\frac{7}{9}$ $-6\frac{4}{9}$	$10\frac{7}{10}$ $-8\frac{2}{10}$	$12\frac{7}{12}$ $-9\frac{5}{12}$
3.	$7\frac{5}{16}$ $+8\frac{1}{16}$	$5\frac{2}{15}$ $+7\frac{1}{15}$	$15\frac{9}{20}$ $-7\frac{4}{20}$	$14\frac{7}{18}$ $-9\frac{1}{18}$
4.	$16\frac{9}{21}$ $-7\frac{2}{21}$	$2\frac{1}{10}$ $+3\frac{1}{10}$	$8\frac{9}{14}$ $-2\frac{5}{14}$	$8\frac{1}{12}$ $+5\frac{1}{12}$
5.	$4\frac{7}{18}$ $+9\frac{1}{18}$	$11\frac{8}{9}$ $-4\frac{2}{9}$	$12\frac{7}{9}$ $-4\frac{4}{9}$	$7\frac{1}{25}$ $+9\frac{4}{25}$
6.	$15\frac{11}{12}$ $-9\frac{3}{12}$	$16\frac{7}{11}$ $-8\frac{3}{11}$	$14\frac{11}{15}$ $-6\frac{2}{15}$	$6\frac{3}{20}$ $+7\frac{1}{20}$
7.	$7\frac{5}{12}$ $+8\frac{1}{12}$	$14\frac{11}{15}$ $-6\frac{2}{15}$	$2\frac{5}{18}$ $+4\frac{1}{18}$	$13\frac{15}{20}$ $-6\frac{5}{20}$
8.	$13\frac{8}{15}$ $-4\frac{2}{15}$	$6\frac{7}{12}$ $+8\frac{1}{12}$	$6\frac{4}{15}$ $+2\frac{2}{15}$	$6\frac{4}{9}$ $-2\frac{1}{9}$
9.	$5\frac{4}{9}$ $+2\frac{2}{9}$	$3\frac{5}{9}$ $+2\frac{1}{9}$	$7\frac{5}{12}$ $-4\frac{1}{12}$	$3\frac{5}{8}$ $-1\frac{1}{8}$

From $5\frac{7}{15}$ take $2\frac{4}{15}$

1. Subtract the fractions.
2. Subtract the whole numbers.
3. Bring over the whole number and the fraction reduced to its lowest terms.

$$\begin{array}{r} 5\frac{7}{15} \\ -2\frac{4}{15} \\ \hline 3\frac{3}{15} = \end{array}$$

Watch your signs.

1.	$6\frac{7}{12}$ $-2\frac{5}{12}$	$6\frac{7}{9}$ $-2\frac{4}{9}$	$6\frac{3}{8}$ $+2\frac{1}{8}$	$5\frac{3}{10}$ $+4\frac{1}{10}$
2.	$9\frac{8}{20}$ $-4\frac{4}{20}$	$8\frac{5}{18}$ $+4\frac{11}{18}$	$4\frac{9}{20}$ $+3\frac{6}{20}$	$5\frac{1}{8}$ $+8\frac{5}{8}$
3.	$7\frac{7}{20}$ $-4\frac{5}{20}$	$12\frac{13}{14}$ $-9\frac{3}{14}$	$15\frac{7}{10}$ $-7\frac{1}{10}$	$18\frac{5}{20}$ $+6\frac{7}{20}$
4.	$6\frac{7}{12}$ $+9\frac{1}{12}$	$20\frac{4}{15}$ $-7\frac{1}{15}$	$19\frac{17}{21}$ $-7\frac{3}{21}$	$8\frac{4}{15}$ $+6\frac{8}{15}$
5.	$6\frac{1}{6}$ $+3\frac{1}{6}$	$18\frac{11}{24}$ $-9\frac{7}{24}$	$5\frac{1}{9}$ $+4\frac{2}{9}$	$6\frac{5}{20}$ $+9\frac{1}{20}$
6.	$14\frac{5}{18}$ $-9\frac{1}{18}$	$17\frac{19}{24}$ $-9\frac{1}{24}$	$16\frac{18}{20}$ $-7\frac{8}{20}$	$6\frac{2}{9}$ $+7\frac{4}{9}$
7.	$2\frac{4}{10}$ $+8\frac{4}{10}$	$12\frac{11}{14}$ $-7\frac{9}{14}$	$14\frac{14}{15}$ $-6\frac{2}{15}$	$13\frac{17}{21}$ $-4\frac{3}{21}$

8. Add $9\frac{2}{15} + 8 + 7\frac{1}{15}$
9. From $9\frac{17}{18}$ take $3\frac{2}{18}$
10. Take $5\frac{1}{10}$ from $9\frac{9}{10}$
11. Add $10\frac{5}{18} + \frac{1}{18} + 12\frac{4}{18}$
12. Take $6\frac{1}{15}$ from $15\frac{11}{15}$

LESSON 13. Subtraction of Fractions

A. From $4\frac{3}{5}$ take $2\frac{3}{5}$.	B. From $1\frac{3}{7}$ take $\frac{3}{7}$.	C. From $3\frac{4}{9}$ take $3\frac{4}{9}$.	D. From $\frac{9}{10}$ take $\frac{9}{10}$.
$4\frac{3}{5}$ $-2\frac{3}{5}$ 2	$1\frac{3}{7}$ $-\frac{3}{7}$ 1	$3\frac{4}{9}$ $-3\frac{4}{9}$ 0	$\frac{9}{10}$ $-\frac{9}{10}$ 0
The answer is **2**	The answer is **1**	The answer is **0**	The answer is **0**

Subtract the following:

1. $6\frac{3}{4}$ $8\frac{2}{5}$ $7\frac{3}{8}$ $9\frac{5}{6}$ $10\frac{4}{7}$
   $1\frac{3}{4}$ $5\frac{2}{5}$ $4\frac{3}{8}$ $4\frac{5}{6}$ $2\frac{4}{7}$
2. $5\frac{1}{6}$ $9\frac{2}{3}$ $10\frac{5}{9}$ $12\frac{4}{5}$ $13\frac{3}{7}$
   $\frac{1}{6}$ $\frac{2}{3}$ $\frac{5}{9}$ $\frac{4}{5}$ $\frac{3}{7}$
3. $5\frac{4}{5}$ $10\frac{3}{8}$ $15\frac{1}{9}$ $6\frac{5}{7}$ $7\frac{1}{12}$
   $5\frac{4}{5}$ $10\frac{3}{8}$ $15\frac{1}{9}$ $6\frac{5}{7}$ $7\frac{1}{12}$
4. $11\frac{1}{15}$ $12\frac{4}{9}$ $12\frac{1}{7}$ $15\frac{3}{11}$ $\frac{7}{9}$
   $3\frac{1}{15}$ $\frac{4}{9}$ $12\frac{1}{7}$ $4\frac{3}{11}$ $\frac{7}{9}$
5. $\frac{8}{9}$ $\frac{6}{7}$ $\frac{9}{14}$ $\frac{4}{15}$ $\frac{11}{20}$ $\frac{5}{12}$ $\frac{4}{5}$
   $\frac{8}{9}$ $\frac{6}{7}$ $\frac{9}{14}$ $\frac{4}{15}$ $\frac{11}{20}$ $\frac{5}{12}$ $\frac{4}{5}$

Find the answer.

1. How much less than $1\frac{5}{9}$ is $\frac{5}{9}$?
2. How much more than $3\frac{5}{8}$ is $7\frac{5}{8}$?
3. Take $25\frac{4}{15}$ from $30\frac{4}{15}$.
4. Subtract 11 from $19\frac{5}{12}$.
5. From $16\frac{3}{20}$ take $16\frac{1}{20}$.
6. Find the difference between $\frac{7}{8}$ and $\frac{1}{8}$.
7. Take 21 from $21\frac{7}{12}$.
8. From $19\frac{1}{2}$ take 19.
9. 13 is how much less than $13\frac{5}{6}$?
10. $14\frac{2}{7}$ is how much more than $10\frac{2}{7}$?

Solve the following:

1. From $8\frac{3}{5}$ take $5\frac{3}{5}$.
2. From $4\frac{5}{9}$ take $2\frac{5}{9}$.
3. From $7\frac{5}{6}$ take $\frac{5}{6}$.
4. From $1\frac{9}{14}$ take $\frac{9}{14}$.
5. From $5\frac{11}{20}$ take $5\frac{11}{20}$.
6. From $\frac{4}{15}$ take $\frac{4}{15}$.
7. From $\frac{3}{10}$ take $\frac{3}{10}$.
8. How much more is $7\frac{4}{9}$ than $2\frac{4}{9}$?
9. How much more is $8\frac{5}{12}$ than $3\frac{5}{12}$?
10. How much more is $26\frac{5}{18}$ than $15\frac{5}{18}$?

What is the remainder when we subtract

1. $4\frac{5}{6}$ from $4\frac{5}{6}$? $\frac{3}{8}$ from $8\frac{3}{8}$?
2. $12\frac{7}{10}$ from $14\frac{7}{10}$? $18\frac{5}{9}$ from $28\frac{5}{9}$?
3. $15\frac{7}{8}$ from $15\frac{7}{8}$? $\frac{7}{11}$ from $\frac{7}{11}$?

What is the difference between?

1. $12\frac{3}{8}$ and $15\frac{3}{8}$? $24\frac{5}{9}$ and $\frac{5}{9}$?
2. $16\frac{1}{4}$ and $12\frac{1}{4}$? $20\frac{1}{10}$ and $\frac{1}{10}$?

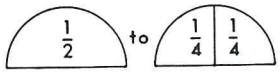
Subtract and match the following columns:

1. $5\frac{4}{15} - 2\frac{1}{15}$ (...?...) $6\frac{3}{7}$
2. $18\frac{6}{7} - 12\frac{3}{7}$ (...?...) 6
3. $15\frac{5}{12} - 4\frac{1}{12}$ (...?...) $3\frac{1}{5}$
4. $6\frac{4}{7} - \frac{4}{7}$ (...?...) 10
5. $10\frac{6}{17} - \frac{6}{17}$ (...?...) $11\frac{1}{3}$

LESSON 14. Fractions With Related Denominators

Only fractions with like denominators can be added or subtracted.

Suppose your mother has $\frac{1}{2}$ of a pie, and $\frac{1}{4}$ of a pie, and you want to express in a single fraction how much pie she has. To do this you must change



Then the $\frac{2}{4}$ and $\frac{1}{4}$ can be added because they have the same name, or they have a common denominator. $\frac{2}{4}+\frac{1}{4}=\frac{3}{4}$

To add $\frac{3}{14}$ and $\frac{4}{7}$:
The common denominator is **14**, because both **7** and **14** are contained in it.
Change $\frac{4}{7}$ to the higher denominator **14**.

To bring $\frac{4}{7}$ to **14**ths:

1. Divide the common denominator **14** by the denominator **7**. The answer is **2**.
2. Multiply the numerator of $\frac{4}{7}$ by **2**. Two **4**'s are **8**. Then **8** is the new numerator.

$$\frac{4}{7}=\frac{8}{14}$$
$$\frac{3}{14}=\frac{3}{14}$$
$$\frac{11}{14}$$

Add:

1.	$\frac{3}{8}$ $\frac{1}{2}$	$\frac{1}{9}$ $\frac{5}{18}$	$\frac{11}{18}$ $\frac{1}{3}$	$\frac{5}{12}$ $\frac{1}{2}$	$\frac{1}{8}$ $\frac{3}{4}$
2.	$\frac{1}{20}$ $\frac{3}{5}$	$\frac{3}{8}$ $\frac{1}{4}$	$\frac{5}{18}$ $\frac{4}{9}$	$\frac{3}{8}$ $\frac{1}{2}$	$\frac{7}{20}$ $\frac{1}{5}$
3.	$\frac{3}{5}$ $\frac{1}{10}$	$\frac{4}{7}$ $\frac{3}{14}$	$\frac{7}{12}$ $\frac{2}{6}$	$\frac{4}{9}$ $\frac{1}{3}$	$\frac{5}{8}$ $\frac{3}{16}$
4.	$\frac{1}{24}$ $\frac{1}{4}$	$\frac{7}{10}$ $\frac{1}{5}$	$\frac{5}{14}$ $\frac{2}{7}$	$\frac{1}{4}$ $\frac{5}{8}$	$\frac{1}{24}$ $\frac{1}{4}$
5.	$\frac{4}{10}$ $\frac{1}{2}$	$\frac{7}{16}$ $\frac{2}{8}$	$\frac{2}{3}$ $\frac{1}{6}$	$\frac{4}{21}$ $\frac{2}{7}$	$\frac{4}{24}$ $\frac{3}{8}$
6.	$\frac{7}{20}$ $\frac{3}{5}$	$\frac{5}{12}$ $\frac{1}{6}$	$\frac{1}{3}$ $\frac{5}{9}$	$\frac{3}{7}$ $\frac{5}{14}$	$\frac{2}{24}$ $\frac{3}{8}$
7.	$\frac{2}{7}$ $\frac{5}{21}$	$\frac{1}{16}$ $\frac{3}{4}$	$\frac{1}{14}$ $\frac{5}{7}$	$\frac{3}{8}$ $\frac{1}{2}$	$\frac{1}{6}$ $\frac{3}{12}$

Subtract:

1.	$\frac{1}{2}$ $\frac{1}{4}$	$\frac{7}{9}$ $\frac{2}{3}$	$\frac{2}{3}$ $\frac{7}{12}$	$\frac{9}{10}$ $\frac{4}{5}$	$\frac{2}{3}$ $\frac{8}{15}$
2.	$\frac{3}{4}$ $\frac{1}{2}$	$\frac{8}{9}$ $\frac{1}{3}$	$\frac{5}{8}$ $\frac{1}{4}$	$\frac{4}{5}$ $\frac{7}{10}$	$\frac{6}{15}$ $\frac{1}{3}$
3.	$\frac{5}{12}$ $\frac{1}{3}$	$\frac{7}{8}$ $\frac{1}{2}$	$\frac{1}{9}$ $\frac{1}{18}$	$\frac{7}{8}$ $\frac{3}{4}$	$\frac{7}{12}$ $\frac{1}{6}$
4.	$\frac{7}{15}$ $\frac{1}{3}$	$\frac{1}{2}$ $\frac{1}{8}$	$\frac{5}{9}$ $\frac{5}{18}$	$\frac{2}{3}$ $\frac{1}{9}$	$\frac{1}{4}$ $\frac{1}{16}$
5.	$\frac{1}{3}$ $\frac{5}{18}$	$\frac{3}{5}$ $\frac{3}{10}$	$\frac{9}{10}$ $\frac{1}{5}$	$\frac{1}{3}$ $\frac{1}{6}$	$\frac{2}{5}$ $\frac{1}{10}$
6.	$\frac{5}{12}$ $\frac{1}{3}$	$\frac{2}{3}$ $\frac{5}{9}$	$\frac{1}{2}$ $\frac{3}{8}$	$\frac{2}{3}$ $\frac{2}{9}$	$\frac{7}{12}$ $\frac{1}{2}$
7.	$\frac{1}{2}$ $\frac{7}{16}$	$\frac{5}{8}$ $\frac{3}{16}$	$\frac{1}{2}$ $\frac{1}{12}$	$\frac{5}{6}$ $\frac{2}{3}$	$\frac{5}{8}$ $\frac{1}{2}$

Practice With Problems

Solve the following:

1. Tom skated for $2\frac{1}{2}$ hours on Crystal Lake on Monday. On Tuesday he skated $1\frac{1}{4}$ hours. How long did he skate altogether?

2. Jim skated $1\frac{3}{4}$ hours. His sister skated for only $\frac{1}{2}$ hour. How much longer than his sister did Jim skate?

3. The blades on Jean's ice skates are $4\frac{1}{6}$ in. long. Harry's blades are $5\frac{1}{3}$ in. long. What is the difference in the lengths of their blades?

4. The children built a snowman at the end of the pond. Its body was $3\frac{1}{4}$ ft. tall. How high was the snowman after the head, measuring $1\frac{1}{2}$ ft., was attached?

5. From Paul's house to Pine Tree Lake is $\frac{3}{4}$ mi. Pine Tree Lake is $\frac{3}{8}$ mi. from Gerard's house. How much farther than Gerard does Paul have to walk to the Lake?

6. During the winter season snow fell on three successive days. If $1\frac{3}{4}$ in. fell the first day, $\frac{3}{8}$ in. the next day, and $\frac{1}{2}$ in. the third day, how many in. of snow fell on the three days?

7. Pine Tree Lake is $2\frac{3}{4}$ miles from St. Maria Goretti's School. Crystal Lake is $1\frac{1}{8}$ mi. farther. How many miles is Crystal Lake from the school?

8. The two skating champions from two large city schools had a race on Pine Tree Lake. One skated for $2\frac{3}{4}$ hr., the other skated $1\frac{3}{4}$ hours. How much longer did the winner skate than his rival?

9. Mr. Sweeney built a private pond behind his home. If it is $40\frac{1}{2}$ ft. long and $35\frac{1}{4}$ ft. wide, what is the difference between the length and the width of the pond?

10. On Monday evening a heavy snowfall lasted $3\frac{5}{8}$ hours. On Tuesday the snow fell for $2\frac{3}{4}$ hr. How many hours altogether did the snow fall?

UNIT 3 Test

Write the answers on your test paper:

Part I

1. The numerator and the denominator are called the ... ? ... of a fraction.

2. In the fraction $\frac{8}{9}$, 8 is the ... ? ... and 9 is the ... ? ... .

3. The fraction $\frac{11}{9}$ is ... ? ... because its value is more than one.

4. In a proper fraction, the numerator is ... ? ... than the denominator.

5. In an improper fraction, the numerator is ... ? ... than the denominator.

6. When the numerator and the denominator are equal, the value of the fractions is ... ? ... .

7. Multiplying both terms of a fraction by the same number ... ? ... (does, does not) change its value.

8. Dividing both terms of a fraction by the same number ... ? ... (does, does not) change its value.

9. To change $3\frac{5}{8}$ to an improper fraction, multiply the whole number 3 by the ... ? ..., and add in the ... ? ... 5.

10. $4\frac{10}{7}$ changed to a simpler form is $5\frac{7}{7}$.

Part II

1. Reduce to lowest terms:

$\frac{24}{30}$ $\frac{18}{21}$ $\frac{16}{20}$ $\frac{21}{28}$ $\frac{35}{40}$

2. $\frac{2}{9}=\frac{?}{27}$ $\frac{3}{8}=\frac{?}{32}$ $\frac{4}{7}=\frac{?}{63}$

3. Change to improper fractions:

$3\frac{1}{4}$ $5\frac{2}{7}$ $2\frac{7}{9}$ $4\frac{5}{6}$

4. Change to mixed numbers:

$\frac{34}{7}$ $\frac{29}{3}$ $\frac{30}{8}$ $\frac{15}{9}$ $\frac{21}{6}$

5. $\frac{3}{8}+\frac{1}{2}=$ $\frac{7}{9}-\frac{2}{3}=$ $6\frac{4}{5}+2\frac{7}{10}=$

6. Which is greater?

$\frac{3}{7}$ or $\frac{5}{14}$? $\frac{2}{5}$ or $\frac{7}{10}$? $\frac{5}{6}$ or $\frac{11}{12}$?

$\frac{3}{5}$ or $\frac{3}{10}$? $\frac{5}{8}$ or $\frac{9}{16}$? $\frac{5}{9}$ or $\frac{11}{18}$?

7. Divide:

$185\overline{)10360}$ $96\overline{)7968}$ $506\overline{)20240}$

Part III

Match Column B with Column A:

A	B
1. (?) $\frac{9}{10}$	a. $5\frac{1}{4}$
2. (?) $3\frac{5}{7}$	b. $\frac{10}{10}$
3. (?) $4\frac{5}{4}$	c. 8
4. (?) $6\frac{9}{9}$	d. $\frac{27}{30}$
5. (?) $\frac{27}{45}$	e. $\frac{7}{8}$
6. (?) 1	f. $\frac{26}{7}$
7. (?) $\frac{17}{6}$	g. 7
8. (?) $\frac{3}{4}+\frac{1}{8}$	h. 1
9. (?) $\frac{24}{3}$	i. $\frac{3}{5}$
10. (?) $\frac{6}{6}$	j. $2\frac{5}{6}$

LESSON 15. Mixed Numbers in Addition and Subtraction (Related Denominators)

Remember:
Fractions must have a common denominator before they can be added or subtracted. The fraction in the answer must be in its lowest terms.

Add $3\frac{7}{15}$ and $4\frac{1}{5}$.

$$3\frac{7}{15} = 3\frac{7}{15}$$
$$4\frac{1}{5} = 4\frac{3}{15}$$
$$7\frac{10}{15} = 7\frac{2}{3}$$

From $6\frac{3}{4}$ take $3\frac{5}{12}$.

$$6\frac{3}{4} = 6\frac{9}{12}$$
$$3\frac{5}{12} = 3\frac{5}{12}$$
$$3\frac{4}{12} = 3\frac{1}{3}$$

Add:

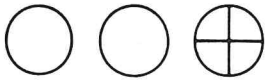
1.	$5\frac{1}{2}$ $2\frac{1}{4}$	$6\frac{1}{5}$ $7\frac{7}{10}$	$8\frac{3}{7}$ $2\frac{5}{14}$	$8\frac{4}{9}$ $2\frac{1}{3}$	$3\frac{1}{4}$ $2\frac{2}{8}$
2.	$7\frac{2}{5}$ $3\frac{3}{20}$	$4\frac{3}{5}$ $1\frac{2}{15}$	$8\frac{3}{4}$ $3\frac{1}{16}$	$9\frac{1}{4}$ $2\frac{5}{24}$	$6\frac{3}{7}$ $4\frac{1}{21}$
3.	$5\frac{3}{4}$ $\frac{1}{12}$	$4\frac{7}{15}$ $7\frac{1}{5}$	$3\frac{5}{12}$ $2\frac{1}{3}$	$4\frac{1}{14}$ $3\frac{3}{7}$	$5\frac{5}{12}$ $\frac{1}{4}$
4.	$6\frac{3}{4}$ $2\frac{1}{12}$	$5\frac{1}{2}$ $3\frac{1}{6}$	$3\frac{1}{4}$ $2\frac{1}{12}$	$9\frac{1}{6}$ $2\frac{1}{3}$	$8\frac{1}{6}$ $2\frac{1}{12}$
5.	$7\frac{2}{5}$ $1\frac{1}{10}$	$6\frac{1}{2}$ $2\frac{1}{6}$	$2\frac{1}{4}$ $1\frac{1}{12}$	$6\frac{1}{2}$ $3\frac{1}{10}$	$5\frac{3}{4}$ $3\frac{1}{12}$
6.	$7\frac{2}{3}$ $1\frac{1}{12}$	$9\frac{2}{5}$ $1\frac{1}{10}$	$2\frac{1}{5}$ $4\frac{3}{10}$	$4\frac{1}{6}$ $2\frac{7}{12}$	$6\frac{1}{4}$ $5\frac{5}{12}$
7.	$7\frac{1}{5}$ $4\frac{1}{20}$	$\frac{1}{2}$ $9\frac{1}{6}$	$6\frac{1}{4}$ $8\frac{9}{20}$	$5\frac{1}{10}$ $3\frac{1}{5}$	$4\frac{4}{15}$ $2\frac{1}{3}$

Subtract:

1.	$3\frac{7}{18} - 1\frac{1}{9}$	$4\frac{15}{16} - 2\frac{1}{8}$	$5\frac{3}{8} - 2\frac{5}{16}$
2.	$6\frac{7}{9} - 4\frac{7}{18}$	$5\frac{2}{3} - 5\frac{2}{9}$	$6\frac{7}{8} - 6\frac{1}{4}$
3.	$8\frac{4}{5} - 2\frac{3}{20}$	$3\frac{5}{16} - 1\frac{1}{8}$	$2\frac{1}{5} - 1\frac{1}{20}$
4.	$4\frac{5}{8} - 2\frac{1}{4}$	$9\frac{3}{8} - 4\frac{5}{16}$	$6\frac{3}{7} - 2\frac{5}{21}$
5.	$5\frac{17}{18} - 4\frac{5}{6}$	$8\frac{3}{5} - 6\frac{1}{10}$	$9\frac{2}{3} - 4\frac{1}{15}$
6.	$7\frac{3}{4} - 2\frac{3}{12}$	$3\frac{5}{6} - 1\frac{1}{2}$	$5\frac{1}{2} - 2\frac{1}{10}$
7.	$6\frac{3}{4} - 2\frac{1}{2}$	$4\frac{2}{3} - 3\frac{1}{6}$	$7\frac{1}{4} - 2\frac{1}{12}$
8.	$8\frac{5}{6} - 4\frac{1}{3}$	$6\frac{2}{3} - 3\frac{2}{9}$	$4\frac{2}{3} - 1\frac{1}{6}$
9.	$7\frac{5}{6} - 2\frac{1}{3}$	$8\frac{5}{12} - 4\frac{1}{6}$	$6\frac{7}{12} - 1\frac{1}{3}$
10.	$9\frac{1}{4} - 6\frac{1}{12}$	$5\frac{6}{7} - 3\frac{5}{14}$	$8\frac{2}{5} - 1\frac{3}{10}$
11.	$8\frac{5}{6} - 4\frac{1}{3}$	$7\frac{5}{12} - 3\frac{1}{4}$	$6\frac{4}{5} - 2\frac{3}{10}$
12.	$4\frac{5}{12} - 1\frac{1}{4}$	$5\frac{5}{12} - 2\frac{1}{4}$	$3\frac{5}{6} - 1\frac{1}{12}$
13.	$6\frac{7}{12} - 1\frac{1}{4}$	$5\frac{3}{4} - 2\frac{1}{12}$	$6\frac{1}{2} - 3\frac{1}{10}$
14.	$7\frac{5}{6} - 2\frac{7}{12}$	$8\frac{1}{2} - 2\frac{1}{6}$	$5\frac{3}{4} - 1\frac{2}{8}$
15.	$6\frac{7}{12} - 2\frac{1}{3}$	$6\frac{13}{20} - 2\frac{1}{4}$	$7\frac{13}{14} - 5\frac{3}{7}$

LESSON 16. Expressing Mixed Numbers in Simpler Form

1. Express $2\frac{4}{4}$ in a simpler form.



$$\frac{4}{4} = 1$$
$$+2$$
$$2\frac{4}{4} = 3$$

Change the improper fraction to **1**. Add this **1** to the whole number.

2. Express $2\frac{7}{4}$ in a simpler form.

$$\frac{7}{4} = 1\frac{3}{4}$$
$$+2$$
$$2\frac{7}{4} = 3\frac{3}{4}$$

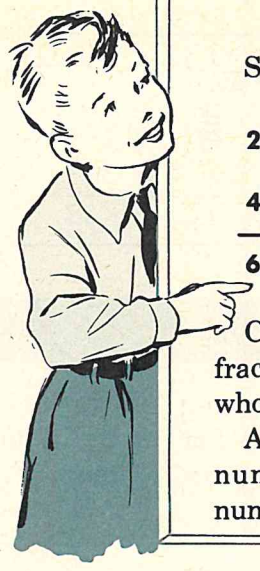
3. Express $2\frac{6}{4}$ in a simpler form.

$$\frac{6}{4} = 1\frac{2}{4} = 1\frac{1}{2}$$
$$+2$$
$$2\frac{6}{4} = 3\frac{1}{2}$$

Change the improper fraction to a mixed number.
See that the fraction of the mixed number is in its lowest terms.
Add the whole number to the mixed number.

Express in its simplest form:

1.	$6\frac{5}{5}$	$9\frac{4}{4}$	$3\frac{8}{8}$	$2\frac{7}{7}$	$9\frac{3}{3}$	$2\frac{9}{9}$	$8\frac{7}{6}$	$7\frac{10}{8}$	$6\frac{9}{7}$	$9\frac{10}{6}$
2.	$8\frac{2}{2}$	$4\frac{6}{6}$	$7\frac{3}{3}$	$6\frac{9}{9}$	$1\frac{8}{8}$	$5\frac{9}{5}$	$2\frac{10}{6}$	$1\frac{10}{6}$	$4\frac{5}{5}$	$3\frac{9}{7}$
3.	$7\frac{4}{4}$	$9\frac{7}{7}$	$4\frac{2}{2}$	$8\frac{5}{5}$	$5\frac{6}{6}$	$8\frac{15}{9}$	$6\frac{3}{3}$	$4\frac{10}{6}$	$7\frac{6}{4}$	$1\frac{5}{5}$
4.	$4\frac{11}{8}$	$9\frac{7}{6}$	$5\frac{8}{7}$	$4\frac{9}{5}$	$2\frac{9}{7}$	$9\frac{12}{9}$	$3\frac{6}{4}$	$1\frac{9}{5}$	$6\frac{12}{9}$	$2\frac{3}{3}$
5.	$8\frac{10}{9}$	$6\frac{9}{5}$	$7\frac{5}{3}$	$6\frac{3}{2}$	$5\frac{5}{4}$	$2\frac{10}{8}$	$4\frac{8}{8}$	$6\frac{9}{5}$	$7\frac{8}{8}$	$3\frac{15}{9}$
6.	$7\frac{15}{8}$	$4\frac{7}{6}$	$8\frac{7}{5}$	$9\frac{8}{7}$	$5\frac{9}{8}$	$3\frac{12}{4}$	$8\frac{6}{4}$	$9\frac{9}{7}$	$8\frac{9}{4}$	$4\frac{6}{9}$
7.	$2\frac{8}{6}$	$1\frac{10}{4}$	$7\frac{12}{8}$	$3\frac{10}{8}$	$6\frac{6}{4}$	$7\frac{7}{6}$	$2\frac{8}{8}$	$1\frac{9}{9}$	$4\frac{15}{8}$	$5\frac{15}{9}$
8.	$5\frac{12}{8}$	$7\frac{12}{9}$	$8\frac{15}{9}$	$6\frac{8}{6}$	$5\frac{9}{6}$	$6\frac{10}{6}$	$3\frac{10}{8}$	$2\frac{14}{7}$	$8\frac{7}{7}$	$9\frac{5}{5}$
9.	$7\frac{10}{6}$	$9\frac{6}{4}$	$6\frac{10}{8}$	$5\frac{8}{6}$	$4\frac{15}{9}$	$9\frac{10}{6}$	$2\frac{7}{6}$	$4\frac{13}{8}$	$7\frac{6}{4}$	$6\frac{10}{5}$
10.	$8\frac{8}{4}$	$6\frac{12}{4}$	$5\frac{15}{5}$	$4\frac{14}{7}$	$3\frac{10}{5}$	$5\frac{9}{7}$	$9\frac{2}{2}$	$6\frac{7}{6}$	$5\frac{10}{5}$	$4\frac{9}{8}$
11.	$2\frac{6}{3}$	$5\frac{8}{2}$	$9\frac{8}{4}$	$6\frac{9}{3}$	$7\frac{8}{4}$	$8\frac{6}{4}$	$7\frac{12}{8}$	$2\frac{7}{6}$	$4\frac{9}{7}$	$3\frac{14}{7}$



A

Add $2\frac{3}{8}$ and $4\frac{5}{8}$

Step 1	Step 2
$2\frac{3}{8}$	$\frac{8}{8} = 1$
$4\frac{5}{8}$	6
$6\frac{8}{8}$ =	7

Change the improper fraction in the sum to a whole number.

Add this whole number to the whole number in the sum.

B

Add $6\frac{4}{5}$ and $2\frac{3}{5}$

Step 1	Step 2
$6\frac{4}{5}$	$\frac{7}{5} = 1\frac{2}{5}$
$2\frac{3}{5}$	8
$8\frac{7}{5}$ =	$9\frac{2}{5}$

Change the improper fraction in the sum to a mixed number. Add this mixed number to the whole number in the sum.

Make sure the fraction in the mixed number is in its lowest terms.

C

Add $3\frac{3}{4}$ and $4\frac{3}{4}$

Step 1	Step 2
$3\frac{3}{4}$	$\frac{6}{4} = 1\frac{2}{4} = 1\frac{1}{2}$
$4\frac{3}{4}$	7
$7\frac{6}{4}$ =	$8\frac{1}{2}$

LESSON 17. Addition of Mixed Numbers With Carrying

Add:

1.	$6\frac{3}{5}$	$8\frac{3}{7}$	$6\frac{4}{11}$	$5\frac{5}{12}$
	$2\frac{2}{5}$	$1\frac{4}{7}$	$2\frac{7}{11}$	$4\frac{7}{12}$
2.	$5\frac{5}{14}$	$4\frac{5}{13}$	$7\frac{4}{9}$	$2\frac{4}{15}$
	$6\frac{9}{14}$	$2\frac{8}{13}$	$4\frac{5}{9}$	$3\frac{11}{15}$
3.	$8\frac{6}{10}$	$6\frac{3}{7}$	$11\frac{1}{8}$	$8\frac{9}{10}$
	$5\frac{4}{10}$	$5\frac{4}{7}$	$5\frac{7}{8}$	$6\frac{1}{10}$
4.	$4\frac{1}{2}$	$9\frac{2}{3}$	$7\frac{4}{5}$	$4\frac{1}{5}$
	$5\frac{1}{2}$	$8\frac{1}{3}$	$9\frac{1}{5}$	$8\frac{4}{5}$
5.	$4\frac{1}{5}$	$9\frac{6}{17}$	$3\frac{4}{11}$	$4\frac{4}{9}$
	6	$8\frac{11}{17}$	$5\frac{2}{11}$	$2\frac{4}{9}$
	$8\frac{4}{5}$	4	$1\frac{5}{11}$	$3\frac{1}{9}$
6.	$5\frac{3}{10}$	$9\frac{1}{13}$	$8\frac{5}{12}$	$12\frac{1}{3}$
	$4\frac{5}{10}$	$\frac{4}{13}$	$6\frac{5}{12}$	8
	$1\frac{2}{10}$	$3\frac{8}{13}$	$\frac{2}{12}$	$5\frac{2}{3}$

Add:

1.	$4\frac{4}{9}$	$5\frac{6}{13}$	$2\frac{3}{11}$	$6\frac{5}{7}$
	$6\frac{7}{9}$	$7\frac{9}{13}$	$4\frac{9}{11}$	$10\frac{4}{7}$
2.	$6\frac{7}{19}$	$4\frac{8}{11}$	$3\frac{7}{8}$	$8\frac{5}{7}$
	$8\frac{17}{19}$	$3\frac{5}{11}$	$5\frac{2}{8}$	$3\frac{6}{7}$
3.	$4\frac{5}{9}$	$5\frac{7}{13}$	$7\frac{3}{11}$	$9\frac{15}{21}$
	$9\frac{8}{9}$	$2\frac{8}{13}$	$9\frac{10}{11}$	$8\frac{16}{21}$
4.	$2\frac{7}{8}$	$5\frac{5}{9}$	$3\frac{5}{12}$	$8\frac{3}{5}$
	$4\frac{5}{8}$	$7\frac{7}{9}$	$1\frac{7}{12}$	$2\frac{4}{5}$
5.	$6\frac{4}{17}$	$8\frac{6}{19}$	$4\frac{11}{13}$	$14\frac{14}{17}$
	$5\frac{8}{17}$	$5\frac{7}{19}$	3	$2\frac{4}{17}$
	$1\frac{9}{17}$	$6\frac{8}{19}$	$1\frac{8}{13}$	6
6.	$4\frac{4}{15}$	$3\frac{5}{7}$	$6\frac{7}{18}$	$2\frac{11}{21}$
	$2\frac{7}{15}$	4	$3\frac{13}{18}$	$1\frac{8}{21}$
	$4\frac{8}{15}$	$5\frac{4}{7}$	6	$4\frac{4}{21}$

Add $5\frac{2}{3}$ and $3\frac{11}{12}$

$5\frac{2}{3} = 5\frac{8}{12}$

$+3\frac{11}{12} = 3\frac{11}{12}$

$8\frac{19}{12}$ = $9\frac{7}{12}$

$\frac{19}{12} = 1\frac{7}{12}$

8

Add $4\frac{3}{4}$ and $2\frac{7}{20}$

$4\frac{3}{4} = 4\frac{15}{20}$

$+2\frac{7}{20} = 2\frac{7}{20}$

$6\frac{22}{20}$ = $7\frac{1}{10}$

$\frac{22}{20} = 1\frac{2}{20} = 1\frac{1}{10}$

6

LESSON 18. Addition of Mixed Numbers With Carrying and Reduction

Remember:

Change the improper fraction in the sum to a mixed number. See that the fraction in the mixed number is in its lowest terms. Add the whole number in the sum to the mixed number.

Add:

1. $4\frac{1}{5} + 6\frac{13}{15}$ $\quad$ $8\frac{6}{7} + 4\frac{3}{14}$
2. $6\frac{8}{9} + 4\frac{1}{3}$ $\quad$ $5\frac{9}{20} + 8\frac{3}{5}$
3. $3\frac{17}{18} + 2\frac{1}{9}$ $\quad$ $8\frac{1}{3} + 4\frac{8}{9}$
4. $4\frac{7}{10} + 8\frac{19}{20}$ $\quad$ $12\frac{7}{10} + 6\frac{3}{5}$
5. $3\frac{7}{12} + 1\frac{5}{6}$ $\quad$ $5\frac{9}{14} + 3\frac{3}{7}$
6. $6\frac{1}{7} + 2\frac{13}{14}$ $\quad$ $5\frac{1}{6} + 4\frac{11}{12}$
7. $5\frac{3}{16} + 5\frac{7}{8}$ $\quad$ $6\frac{7}{9} + 2\frac{11}{18}$
8. $6\frac{1}{5} + 4\frac{19}{20}$ $\quad$ $1\frac{4}{7} + 2\frac{9}{14}$
9. $5\frac{1}{3} + 4\frac{5}{6}$ $\quad$ $7\frac{15}{16} + 1\frac{3}{8}$
10. $4\frac{2}{3} + 5\frac{7}{18}$ $\quad$ $9\frac{7}{16} + 4\frac{3}{4}$
11. $6\frac{5}{9} + 4\frac{2}{3}$ $\quad$ $6\frac{7}{18} + 3\frac{2}{3}$
12. $7\frac{5}{14} + 8\frac{5}{7}$ $\quad$ $9\frac{4}{5} + 2\frac{9}{25}$
13. $6\frac{17}{32} + 4\frac{5}{8}$ $\quad$ $3\frac{9}{16} + 2\frac{3}{4}$
14. $6\frac{2}{3} + 5\frac{13}{24}$ $\quad$ $2\frac{4}{5} + 6\frac{9}{10}$

Add:

1.	$3\frac{11}{12}$	$6\frac{19}{20}$	$2\frac{14}{15}$	$6\frac{13}{20}$
	$2\frac{5}{6}$	$4\frac{3}{4}$	$7\frac{2}{5}$	$2\frac{3}{5}$
2.	$7\frac{5}{18}$	$2\frac{3}{10}$	$4\frac{7}{9}$	$4\frac{1}{4}$
	$4\frac{8}{9}$	$4\frac{19}{20}$	$12\frac{7}{18}$	$2\frac{11}{12}$
3.	$1\frac{17}{20}$	$8\frac{5}{6}$	$3\frac{9}{20}$	$3\frac{7}{9}$
	$2\frac{3}{4}$	$2\frac{5}{12}$	$2\frac{3}{4}$	$4\frac{7}{18}$
4.	$6\frac{7}{20}$	$2\frac{3}{4}$	$6\frac{9}{14}$	$8\frac{3}{4}$
	$4\frac{9}{10}$	$6\frac{7}{20}$	$1\frac{6}{7}$	$2\frac{5}{12}$
5.	$5\frac{2}{9}$	$7\frac{5}{9}$	$3\frac{11}{14}$	$9\frac{11}{20}$
	$6\frac{17}{18}$	$4\frac{17}{18}$	$8\frac{5}{7}$	$4\frac{7}{10}$
6.	$4\frac{3}{5}$	$2\frac{7}{12}$	$8\frac{5}{12}$	$3\frac{7}{12}$
	$10\frac{11}{15}$	$8\frac{2}{3}$	$7\frac{3}{4}$	$5\frac{3}{4}$
7.	$8\frac{5}{6}$	$2\frac{7}{8}$	$7\frac{3}{5}$	$9\frac{7}{10}$
	$7\frac{7}{24}$	$2\frac{9}{40}$	$9\frac{14}{20}$	$1\frac{4}{5}$
8.	$3\frac{14}{15}$	$1\frac{13}{18}$	$2\frac{4}{5}$	$8\frac{9}{14}$
	$8\frac{2}{3}$	$3\frac{5}{6}$	$4\frac{13}{15}$	$2\frac{6}{7}$

Practice With Problems

Solve the following:

1. Tom skated for $2\frac{1}{2}$ hours on Crystal Lake on Monday. On Tuesday he skated $1\frac{1}{4}$ hours. How long did he skate altogether?

2. Jim skated $1\frac{3}{4}$ hours. His sister skated for only $\frac{1}{2}$ hour. How much longer than his sister did Jim skate?

3. The blades on Jean's ice skates are $4\frac{1}{6}$ in. long. Harry's blades are $5\frac{1}{3}$ in. long. What is the difference in the lengths of their blades?

4. The children built a snowman at the end of the pond. Its body was $3\frac{1}{4}$ ft. tall. How high was the snowman after the head, measuring $1\frac{1}{2}$ ft., was attached?

5. From Paul's house to Pine Tree Lake is $\frac{3}{4}$ mi. Pine Tree Lake is $\frac{3}{8}$ mi. from Gerard's house. How much farther than Gerard does Paul have to walk to the Lake?

6. During the winter season snow fell on three successive days. If $1\frac{3}{4}$ in. fell the first day, $\frac{3}{8}$ in. the next day, and $\frac{1}{2}$ in. the third day, how many in. of snow fell on the three days?

7. Pine Tree Lake is $2\frac{3}{4}$ miles from St. Maria Goretti's School. Crystal Lake is $1\frac{1}{8}$ mi. farther. How many miles is Crystal Lake from the school?

8. The two skating champions from two large city schools had a race on Pine Tree Lake. One skated for $2\frac{3}{4}$ hr., the other skated $1\frac{3}{4}$ hours. How much longer did the winner skate than his rival?

9. Mr. Sweeney built a private pond behind his home. If it is $40\frac{1}{2}$ ft. long and $35\frac{1}{4}$ ft. wide, what is the difference between the length and the width of the pond?

10. On Monday evening a heavy snowfall lasted $3\frac{5}{8}$ hours. On Tuesday the snow fell for $2\frac{3}{4}$ hr. How many hours altogether did the snow fall?

UNIT 3 Test

Write the answers on your test paper:

Part I

1. The numerator and the denominator are called the ..?.. of a fraction.

2. In the fraction $\frac{8}{9}$, 8 is the ..?.. and 9 is the ..?..

3. The fraction $\frac{11}{9}$ is ..?.. because its value is more than one.

4. In a proper fraction, the numerator is ..?.. than the denominator.

5. In an improper fraction, the numerator is ..?.. than the denominator.

6. When the numerator and the denominator are equal, the value of the fractions is ..?..

7. Multiplying both terms of a fraction by the same number ..?.. (does, does not) change its value.

8. Dividing both terms of a fraction by the same number ..?.. (does, does not) change its value.

9. To change $3\frac{5}{8}$ to an improper fraction, multiply the whole number 3 by the ..?.., and add in the ..?.. 5.

10. $4\frac{10}{7}$ changed to a simpler form is $5\frac{}{7}$.

Part II

1. Reduce to lowest terms:

$\frac{24}{30}$ $\frac{18}{21}$ $\frac{16}{20}$ $\frac{21}{28}$ $\frac{35}{40}$

2. $\frac{2}{9}=\frac{?}{27}$ $\frac{3}{8}=\frac{?}{32}$ $\frac{4}{7}=\frac{?}{63}$

3. Change to improper fractions:

$3\frac{1}{4}$ $5\frac{2}{7}$ $2\frac{7}{9}$ $4\frac{5}{6}$

4. Change to mixed numbers:

$\frac{34}{7}$ $\frac{29}{3}$ $\frac{30}{8}$ $\frac{15}{9}$ $\frac{21}{6}$

5. $\frac{3}{8}+\frac{1}{2}=$ $\frac{7}{9}-\frac{2}{3}=$ $6\frac{4}{5}+2\frac{7}{10}=$

6. Which is greater?

$\frac{3}{7}$ or $\frac{5}{14}$? $\frac{2}{5}$ or $\frac{7}{10}$? $\frac{5}{6}$ or $\frac{11}{12}$?

$\frac{3}{5}$ or $\frac{3}{10}$? $\frac{5}{8}$ or $\frac{9}{16}$? $\frac{5}{9}$ or $\frac{11}{18}$?

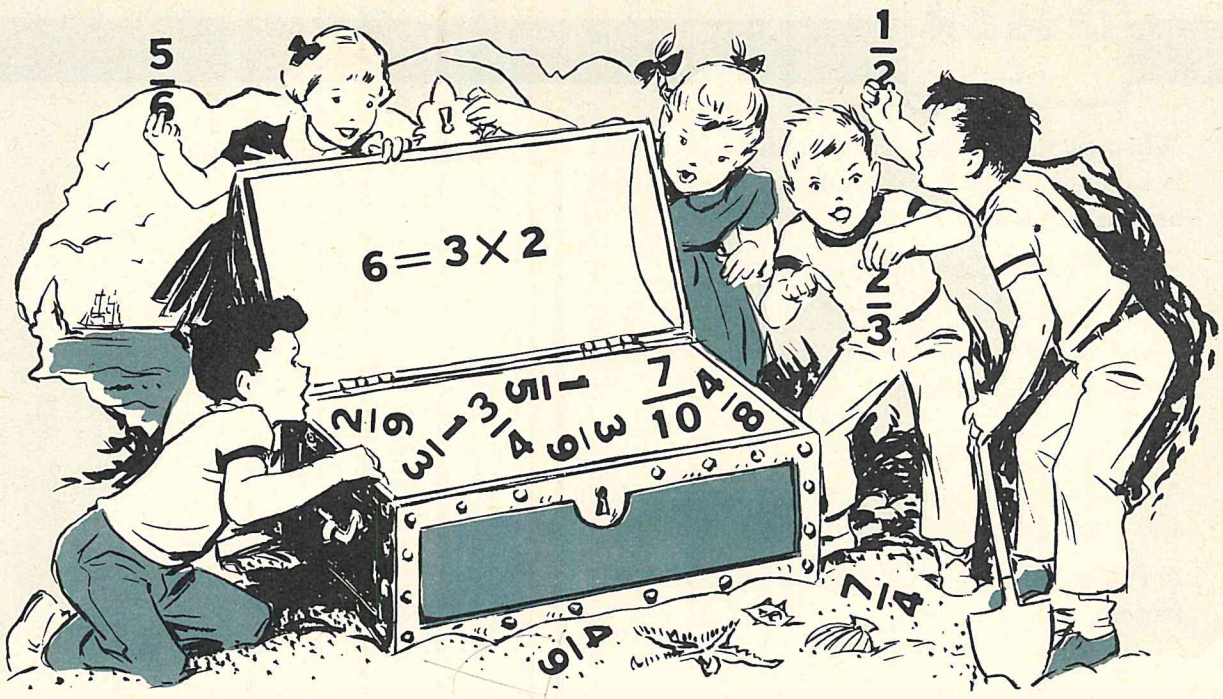
7. Divide:

$185\overline{)10360}$ $96\overline{)7968}$ $506\overline{)20240}$

Part III

Match Column B with Column A:

A	B
1. (?) $\frac{9}{10}$	a. $5\frac{1}{4}$
2. (?) $3\frac{5}{7}$	b. $\frac{10}{10}$
3. (?) $4\frac{5}{4}$	c. 8
4. (?) $6\frac{9}{9}$	d. $\frac{27}{30}$
5. (?) $\frac{27}{45}$	e. $\frac{7}{8}$
6. (?) 1	f. $\frac{26}{7}$
7. (?) $\frac{17}{6}$	g. 7
8. (?) $\frac{3}{4}+\frac{1}{8}$	h. 1
9. (?) $\frac{24}{3}$	i. $\frac{3}{5}$
10. (?) $\frac{6}{6}$	j. $2\frac{5}{6}$



UNIT 4 • MORE WORK WITH FRACTIONS

How Well Do You Remember?

1. Fractions can be added and subtracted only when they have the ..?.. denominator.

2. The common denominator of $\frac{3}{5}$ and $\frac{7}{10}$ is ..?..

3. In adding fractions, add the ..?.., place the sum over the ..?..

4. The fraction in the answer to an addition or subtraction example must be in its ..?.. terms.

5. To reduce a fraction to its lowest terms, ..?.. the numerator and the ..?.. by the highest number that is contained in ..?.. of them.

6. To change a fraction to higher terms, ..?.. the numerator and the ..?.. by the same number.

7. When two numbers are multiplied together the answer is called a ..?..

8. When two numbers are multiplied, each of the numbers multiplied is called a ..?..

9. 3 and 4 are factors of ..?..

10. 12 is divisible by ..?.. and by ..?..

11. $1=\frac{?}{4}$ $\quad 3=\frac{?}{4}$ $\quad 1=\frac{?}{5}$ $\quad 4=\frac{?}{5}$

12. $3\frac{1}{2}=\frac{?}{2}$ $\quad 9\frac{4}{5}=\frac{?}{5}$ $\quad 7\frac{5}{6}=\frac{?}{6}$

13. Express in a simpler form:
$1\frac{4}{4}$ $\quad 8\frac{5}{4}$ $\quad 9\frac{10}{8}$ $\quad 10\frac{13}{12}$

14. $\frac{5}{9}+\frac{2}{9}$ $\quad \frac{5}{8}+\frac{1}{8}$ $\quad \frac{3}{7}+\frac{2}{7}$

15. $\frac{7}{9}-\frac{5}{9}$ $\quad \frac{4}{5}-\frac{1}{5}$ $\quad \frac{5}{7}-\frac{4}{7}$

LESSON 1. Prime and Composite Numbers

When two numbers are multiplied, the result is called a product. The numbers multiplied are called factors.

Product = factor × factor
21 = 7 × 3

7 and **3** are factors of **21**, therefore each is exactly contained in **21**.

A number that has no factors except itself and 1 is called a Prime Number.

A Prime Number is considered as having nó factors.

Prime Numbers between 1 and 25 are:

2 = 2 × 1	**7 = 7 × 1**	**17 = 17 × 1**
3 = 3 × 1	**11 = 11 × 1**	**19 = 19 × 1**
5 = 5 × 1	**13 = 13 × 1**	**23 = 23 × 1**

All numbers that are not Prime are called Composite Numbers.

A Composite Number is one that is composed of factors, as:

4 = 2 × 2	**10 = 5 × 2**
6 = 3 × 2	**14 = 7 × 2**

Some factors are prime, others are composite as,

8 = 2 × 4 2 is a prime factor
4 is a composite factor
8 = 2 × 2 × 2 all factors are prime

Tell whether each of the following is a prime or a composite number.

2,	8,	9,	11,	3,	15,	4,	19,	10
6,	7,	13,	5,	17,	12,	18,	23,	24
20,	22,	21,	28,	29,	27,	31,	30,	25
41,	45,	49,	51,	46,	52,	59,	56,	53

Supply the missing factor

36 = 6 × ?
= 12 × ?
= 9 × ?
= 18 × ?

30 = 5 × ?
= 2 × ?
= 3 × ?

24 = 8 × ?
= 6 × ?
= 12 × ?

45 = 9 × ?
= 3 × ?

42 = 6 × ?
= 2 × ?

48 = 24 × ?
= 6 × ?
= 16 × ?

72 = 8 × ?
= 6 × ?
= 4 × ?
= 2 × ?

60 = 5 × ?
= 2 × ?
= 3 × ?
= 4 × ?
= 6 × ?

84 = 7 × ?
= 3 × ?
= 6 × ?
= 4 × ?

80 = 8 × ?
= 4 × ?
= 2 × ?
= 5 × ?

56 = 8 × ?
= 2 × ?
= 4 × ?

40 = 8 × ?
= 2 × ?
= 4 × ?

54 = 6 × ?
= 2 × ?
= 3 × ?

Give a set of factors for each number. Break up composite factors into prime factors.

36 = 6 × 6 = 3 × 2 × 3 × 2

24 = ?	12 = ?	63 = ?
20 = ?	18 = ?	64 = ?
16 = ?	30 = ?	90 = ?
48 = ?	40 = ?	81 = ?

LESSON 2. Multiples

Multiples express multiplication and division facts.

The multiples of **6** as far as **6×9** are:
6, 12, 18, 24, 30, 36, 42, 48, and **54.**

The multiples of **9** as far as **9×9** are:
9, 18, 27, 36, 45, 54, 63, 72, and **81.**

When we compare the above multiples of **6** and **9**, we find some multiples are alike:

18 **36** **54**

This shows that **18, 36,** and **54** contain **6** and also **9.**

$6\overline{)18}$ $9\overline{)18}$ $6\overline{)36}$ $9\overline{)36}$ $6\overline{)54}$ $9\overline{)54}$

Then **18** is a common multiple of **6** and **9**
36 is a common multiple of **6** and **9**
54 is a common multiple of **6** and **9**

The least of these common multiples is **18.**

So **18** is the least common multiple of **6** and **9.**

L.C.M. means least common multiple.

Some of the multiples of 3, 4, and 6 are:

3, 6, 9, **12,** 15, 18, 21, **24**
4, 8, **12,** 16, 20, **24,** 28, 32
6, **12,** 18, **24,** 30, 36, 42, 48

The common multiples of 3, 4, and 6 are ...(?)... and ...(?)....

The least common multiple of 3, 4, and 6 is ...(?)....

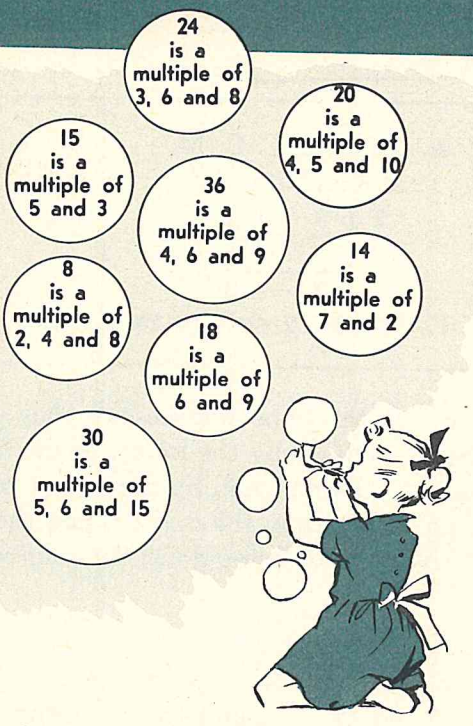
36 is a product of 9 and ...(?)....

36 is a product of 12 and ...(?)....

Therefore, 36 is a common multiple of ...(?)..., ...(?)..., ...(?)..., and ...(?)....

A common multiple is a number that exactly contains each of the given numbers.

The least common multiple of two or more numbers is the smallest number that exactly contains each of the given numbers.


24 is a multiple of 3, 6 and 8
20 is a multiple of 4, 5 and 10
15 is a multiple of 5 and 3
36 is a multiple of 4, 6 and 9
14 is a multiple of 7 and 2
8 is a multiple of 2, 4 and 8
18 is a multiple of 6 and 9
30 is a multiple of 5, 6 and 15

What is the smallest number that is exactly divisible by each pair:?

1. 3 and 4
2. 4 and 5
3. 2 and 3
4. 3 and 7
5. 6 and 5
6. 5 and 3
7. 7 and 4
8. 2 and 10
9. 9 and 15
10. 6 and 7
11. 7 and 5
12. 6 and 4
13. 6 and 8
14. 5 and 10
15. 9 and 6
16. 8 and 12
17. 4 and 10
18. 8 and 10
19. 6 and 15
20. 6 and 10

1. 24 is a multiple of 12 and ...(?)...; 6 and ...(?)...; 8 and ...(?)....
2. 36 is a multiple of 6 and ...(?)...; 12 and ...(?)...; 9 and ...(?)....
3. 30 is a multiple of 3 and ...(?)...; 5 and ...(?)...; 2 and ...(?)....
4. 40 is a multiple of 8 and ...(?)...; 2 and ...(?)...; 10 and ...(?)....

LESSON 3. Finding the Least Common Multiple

A. Find the L. C. M. of **8** and **12**

2	8 — 12
2	4 — 6
	2 — 3

L. C. M. = **2×2×2×3 = 24**

B. Find the L. C. M. of **12** and **18**

2	12 — 18
3	6 — 9
	2 — 3

L. C. M. = **2×3×2×3 = 36**

C. Find the L. C. M. of **3**, **4**, and **6**

2	3 — 4 — 6
3	3 — 2 — 3
	1 — 2 — 1

L. C. M. = **2×3×2 = 12**

Study the steps and see how they are used in each of the above examples.

Step 1. Divide by the lowest prime factor contained in at least two of the numbers.

Step 2. Divide again by the lowest prime factor contained in at least two of the numbers.

Step 3. Multiply the divisors and the remaining numbers to find the L. C. M.

(*Note:* In C, bring down the number that is not divisible in each line.)

Find the L. C. M. of:

1.	10 and 12	9 and 15	7 and 10
2.	10 and 24	6 and 8	10 and 18
3.	8 and 20	4 and 6	10 and 15
4.	9 and 12	6 and 15	4 and 10
5.	2, 6, and 8	4, 12, and 16	
6.	3, 6, and 8	4, 8, and 12	
7.	3, 4, and 6	7, 14, and 4	
8.	9, 4, and 6	5, 8, and 10	
9.	5, 18, and 10	6, 12, and 15	
10.	3, 9, and 12	8, 12, and 24	
11.	6, 4, and 12	8, 12, and 6	
12.	3, 8, and 12	6, 9, and 18	
13.	2, 4, and 8	3, 9, and 27	
14.	3, 6, and 9	6, 15, and 30	
15.	5, 6, and 8	6, 12, and 18	
16.	7, 4, and 21	6, 8, and 24	
17.	3, 4, and 9	12, 9, and 27	
18.	5, 6, and 3	7, 10, and 21	
19.	5, 9, and 15	9, 18, and 6	
20.	3, 6, and 18	16, 24, and 3	

Find the L. C. M. of:

1.	2, 3, 4, and 8	2, 4, 6, and 8
2.	4, 6, 8, and 12	3, 6, 9, and 12
3.	4, 5, 10, and 15	3, 6, 9, and 15
4.	3, 6, 9, and 18	6, 9, 8, and 12
5.	6, 4, 9, and 12	6, 9, 12, and 18
6.	3, 9, 5, and 15	3, 4, 6, and 18
7.	2, 4, 6, and 9	3, 5, 9, and 10
8.	2, 3, 4, and 9	2, 4, 7, and 14
9.	3, 2, 5, and 10	4, 2, 5, and 10
10.	2, 3, 9, and 6	2, 6, 9, and 12
11.	6, 4, 8, and 9	4, 8, 12, and 16
12.	5, 10, 15, and 20	7, 4, 21, and 28
13.	3, 9, 18, and 27	8, 14, 16, and 21
14.	2, 14, 20, and 12	1, 15, 25, and 30
15.	5, 9, 10, and 15	2, 7, 21, and 35
16.	8, 9, 18, and 24	3, 12, 15, and 28
17.	7, 4, 12, and 21	5, 6, 18, and 25
18.	4, 9, 20, and 27	9, 21, 12, and 15
19.	7, 21, 15, and 35	8, 10, 12, and 20
20.	1, 7, 9, and 28	3, 5, 9, and 30

Add $\frac{3}{4}$ and $\frac{1}{6}$.

$$\frac{3}{4}=\frac{9}{12}$$

$$\frac{1}{6}=\frac{2}{12}$$

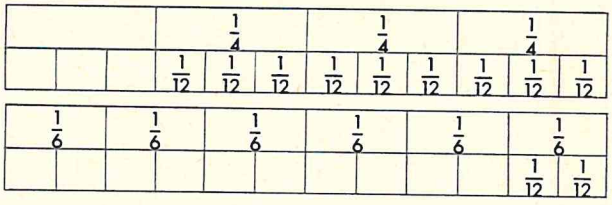
$$\frac{11}{12}$$

$$2 \mid \begin{array}{c|c} 4 & 6 \\ \hline 2 & 3 \end{array}$$

L.C.M. $= 2\times2\times3 = 12$

1. To add $\frac{3}{4}$ and $\frac{1}{6}$ first change them to a common denominator. Find the least common denominator by finding the L.C.M. of **4** and **6**. The L.C.M. is **12**. 2. Divide the common denominator **12** by the denominator **4**; the answer is **3**. Multiply the numerator of $\frac{3}{4}$ by **3**. Three **3**'s are **9**. Write **9** over **12** as $\frac{9}{12}$. Then $\frac{3}{4}=\frac{9}{12}$. 3. Divide the common denominator **12** by the denominator **6**. The answer is **2**. Multiply the numerator of $\frac{1}{6}$ by **2**. Two **1**'s are **2**. Write **2** over **12** as $\frac{2}{12}$. Thus $\frac{1}{6}=\frac{2}{12}$. 4. Add the numerators **2** and **9**. Write **11** over the denominator **12**. The answer is $\frac{11}{12}$.

LESSON 4. Adding Fractions With Unlike Denominators



Fractions must have the same denominator before they can be added or subtracted.

Add. Be sure the answer is in its lowest terms.

1.	$\frac{1}{4}+\frac{1}{6}$	$\frac{1}{8}+\frac{1}{12}$	$\frac{1}{4}+\frac{1}{10}$
2.	$\frac{1}{6}+\frac{1}{8}$	$\frac{5}{24}+\frac{1}{16}$	$\frac{4}{9}+\frac{2}{15}$
3.	$\frac{5}{12}+\frac{3}{20}$	$\frac{1}{15}+\frac{5}{6}$	$\frac{3}{10}+\frac{5}{12}$
4.	$\frac{4}{15}+\frac{1}{6}$	$\frac{1}{14}+\frac{5}{8}$	$\frac{1}{8}+\frac{1}{20}$
5.	$\frac{1}{12}+\frac{1}{16}$	$\frac{1}{12}+\frac{1}{18}$	$\frac{1}{6}+\frac{1}{16}$
6.	$\frac{2}{9}+\frac{7}{12}$	$\frac{1}{6}+\frac{1}{10}$	$\frac{3}{10}+\frac{5}{14}$
7.	$\frac{2}{9}+\frac{1}{15}$	$\frac{3}{8}+\frac{5}{18}$	$\frac{3}{10}+\frac{4}{15}$
8.	$\frac{1}{8}+\frac{3}{20}$	$\frac{1}{8}+\frac{1}{10}$	$\frac{1}{4}+\frac{1}{14}$
9.	$\frac{1}{6}+\frac{3}{20}$	$\frac{1}{4}+\frac{5}{18}$	$\frac{7}{15}+\frac{3}{20}$
10.	$\frac{3}{10}+\frac{3}{18}$	$\frac{1}{6}+\frac{1}{14}$	$\frac{1}{6}+\frac{3}{14}$
11.	$\frac{3}{10}+\frac{3}{8}$	$\frac{7}{9}+\frac{1}{15}$	$\frac{5}{9}+\frac{1}{6}$

Subtract. Be sure answer is in its lowest terms.

1.	$\frac{1}{12}-\frac{1}{15}$	$\frac{3}{4}-\frac{3}{10}$	$\frac{1}{4}-\frac{1}{14}$
2.	$\frac{3}{8}-\frac{3}{20}$	$\frac{5}{12}-\frac{5}{18}$	$\frac{4}{9}-\frac{4}{15}$
3.	$\frac{5}{6}-\frac{1}{8}$	$\frac{1}{6}-\frac{1}{10}$	$\frac{3}{4}-\frac{3}{18}$
4.	$\frac{7}{10}-\frac{5}{12}$	$\frac{1}{12}-\frac{1}{20}$	$\frac{7}{8}-\frac{3}{10}$
5.	$\frac{3}{4}-\frac{1}{6}$	$\frac{3}{8}-\frac{1}{12}$	$\frac{7}{8}-\frac{5}{12}$
6.	$\frac{7}{12}-\frac{1}{10}$	$\frac{8}{10}-\frac{7}{15}$	$\frac{5}{6}-\frac{3}{20}$
7.	$\frac{5}{6}-\frac{1}{9}$	$\frac{5}{6}-\frac{1}{4}$	$\frac{5}{6}-\frac{3}{8}$
8.	$\frac{2}{3}-\frac{1}{6}$	$\frac{7}{10}-\frac{1}{4}$	$\frac{7}{9}-\frac{1}{6}$
9.	$\frac{7}{15}-\frac{1}{6}$	$\frac{5}{6}-\frac{4}{9}$	$\frac{5}{6}-\frac{3}{15}$
10.	$\frac{1}{4}-\frac{1}{6}$	$\frac{3}{4}-\frac{1}{10}$	$\frac{3}{8}-\frac{3}{10}$
11.	$\frac{5}{6}-\frac{3}{4}$	$\frac{3}{14}-\frac{1}{6}$	$\frac{5}{6}-\frac{3}{8}$

Add $\frac{7}{15}$ and $\frac{7}{10}$.

The common denominator is **30**.

Step 1:

$$\begin{array}{r|l} 5 & 15 \quad 10 \\ \hline & 3 \quad 2 \end{array}$$

L.C.M. = $5 \times 3 \times 2 = 30$

$$\begin{aligned} \tfrac{7}{15} &= \tfrac{}{30} \\ +\tfrac{7}{10} &= \tfrac{}{30} \end{aligned}$$

Step 2:

15 into 30, 2
Two 7's are 14.
10 into 30, 3
Three 7's are 21.

$$\begin{aligned} \tfrac{7}{15} &= \tfrac{14}{30} \\ \tfrac{7}{10} &= \tfrac{21}{30} \end{aligned}$$

Step 3:

Add the fractions.

$$\begin{aligned} \tfrac{7}{15} &= \tfrac{14}{30} \\ \tfrac{7}{10} &= \tfrac{21}{30} \\ \hline & \tfrac{35}{30} \end{aligned}$$

Step 4:

Change $\frac{35}{30}$ to $1\frac{1}{6}$.

$$\begin{aligned} \tfrac{7}{15} &= \tfrac{14}{30} \\ \tfrac{7}{10} &= \tfrac{21}{30} \\ \hline & \tfrac{35}{30} = 1\tfrac{5}{30} = 1\tfrac{1}{6} \end{aligned}$$

More Addition With Unlike Denominators

Add:

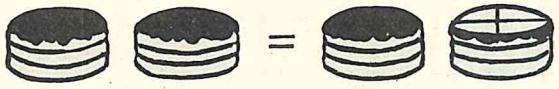
1.	$\frac{7}{12}$	$\frac{9}{10}$	$\frac{8}{9}$	$\frac{5}{6}$	$\frac{7}{10}$	$\frac{5}{6}$
	$\frac{5}{8}$	$\frac{5}{12}$	$\frac{4}{15}$	$\frac{7}{10}$	$\frac{9}{14}$	$\frac{3}{8}$
2.	$\frac{9}{10}$	$\frac{7}{8}$	$\frac{3}{4}$	$\frac{7}{9}$	$\frac{7}{10}$	$\frac{7}{9}$
	$\frac{3}{18}$	$\frac{3}{20}$	$\frac{5}{6}$	$\frac{4}{15}$	$\frac{8}{15}$	$\frac{5}{12}$
3.	$\frac{5}{6}$	$\frac{3}{4}$	$\frac{5}{10}$	$\frac{5}{8}$	$\frac{5}{6}$	$\frac{1}{4}$
	$\frac{7}{15}$	$\frac{5}{6}$	$\frac{3}{4}$	$\frac{11}{12}$	$\frac{3}{10}$	$\frac{5}{6}$
4.	$\frac{7}{9}$	$\frac{5}{8}$	$\frac{3}{8}$	$\frac{7}{9}$	$\frac{3}{10}$	$\frac{8}{9}$
	$\frac{4}{15}$	$\frac{11}{20}$	$\frac{11}{12}$	$\frac{5}{6}$	$\frac{3}{4}$	$\frac{5}{6}$
5.	$\frac{5}{18}$	$\frac{4}{15}$	$\frac{7}{8}$	$\frac{5}{9}$	$\frac{5}{12}$	$\frac{11}{14}$
	$\frac{3}{4}$	$\frac{5}{6}$	$\frac{5}{12}$	$\frac{5}{6}$	$\frac{11}{18}$	$\frac{5}{6}$
6.	$\frac{3}{4}$	$\frac{9}{10}$	$\frac{11}{15}$	$\frac{9}{10}$	$\frac{1}{10}$	$\frac{13}{18}$
	$\frac{11}{14}$	$\frac{11}{15}$	$\frac{5}{6}$	$\frac{5}{18}$	$\frac{11}{12}$	$\frac{3}{4}$
7.	$\frac{5}{6}$	$\frac{4}{15}$	$\frac{7}{9}$	$\frac{4}{5}$	$\frac{11}{12}$	$\frac{1}{6}$
	$\frac{9}{10}$	$\frac{5}{6}$	$\frac{4}{15}$	$\frac{3}{8}$	$\frac{7}{18}$	$\frac{11}{12}$
8.	$\frac{1}{10}$	$\frac{3}{10}$	$\frac{1}{9}$	$\frac{1}{8}$	$\frac{1}{9}$	$\frac{2}{9}$
	$\frac{17}{18}$	$\frac{1}{4}$	$\frac{7}{12}$	$\frac{11}{20}$	$\frac{1}{6}$	$\frac{5}{6}$

Add:

1.	$\frac{1}{9}$	$\frac{1}{6}$	$\frac{9}{10}$	$\frac{7}{10}$	$\frac{7}{8}$	$\frac{7}{10}$
	$\frac{7}{15}$	$\frac{9}{10}$	$\frac{5}{12}$	$\frac{9}{14}$	$\frac{3}{20}$	$\frac{8}{15}$
2.	$\frac{8}{9}$	$\frac{5}{6}$	$\frac{3}{4}$	$\frac{7}{9}$	$\frac{5}{6}$	$\frac{9}{10}$
	$\frac{4}{15}$	$\frac{2}{9}$	$\frac{5}{6}$	$\frac{5}{12}$	$\frac{7}{10}$	$\frac{3}{18}$
3.	$\frac{1}{12}$	$\frac{5}{18}$	$\frac{7}{9}$	$\frac{5}{8}$	$\frac{9}{10}$	$\frac{7}{18}$
	$\frac{7}{18}$	$\frac{1}{12}$	$\frac{7}{15}$	$\frac{5}{12}$	$\frac{17}{18}$	$\frac{7}{12}$
4.	$\frac{3}{8}$	$\frac{1}{9}$	$\frac{4}{9}$	$\frac{1}{4}$	$\frac{13}{18}$	$\frac{9}{10}$
	$\frac{11}{20}$	$\frac{5}{6}$	$\frac{1}{15}$	$\frac{5}{6}$	$\frac{11}{12}$	$\frac{4}{6}$
5.	$\frac{1}{8}$	$\frac{1}{6}$	$\frac{3}{8}$	$\frac{1}{6}$	$\frac{5}{8}$	$\frac{3}{18}$
	$\frac{11}{12}$	$\frac{5}{8}$	$\frac{7}{10}$	$\frac{1}{8}$	$\frac{3}{14}$	$\frac{3}{4}$
6.	$\frac{1}{8}$	$\frac{7}{18}$	$\frac{5}{6}$	$\frac{1}{14}$	$\frac{3}{16}$	$\frac{1}{18}$
	$\frac{5}{14}$	$\frac{1}{4}$	$\frac{3}{10}$	$\frac{1}{4}$	$\frac{1}{12}$	$\frac{1}{12}$
7.	$\frac{11}{20}$	$\frac{3}{14}$	$\frac{1}{6}$	$\frac{7}{8}$	$\frac{5}{18}$	$\frac{1}{4}$
	$\frac{5}{16}$	$\frac{3}{4}$	$\frac{5}{12}$	$\frac{1}{14}$	$\frac{1}{12}$	$\frac{1}{18}$
8.	$\frac{5}{6}$	$\frac{8}{16}$	$\frac{2}{16}$	$\frac{1}{14}$	$\frac{7}{12}$	$\frac{11}{18}$
	$\frac{3}{16}$	$\frac{1}{12}$	$\frac{5}{12}$	$\frac{3}{4}$	$\frac{9}{16}$	$\frac{5}{12}$

LESSON 5. Introducing Borrowing With Fractions

Mother baked **2** chocolate cakes. She gave $\frac{3}{4}$ of a cake to the children. How much had she left?



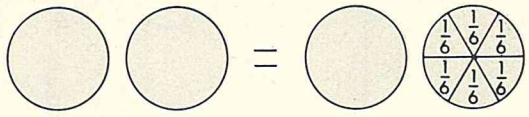
2 = $1\frac{4}{4}$

Change **2** to $1\frac{4}{4}$ — $2 = 1\frac{4}{4}$

Take away $\frac{3}{4}$ — $-\frac{3}{4} = \frac{3}{4}$

The remainder is $1\frac{1}{4}$ — $1\frac{1}{4}$

From **2** take $1\frac{5}{6}$



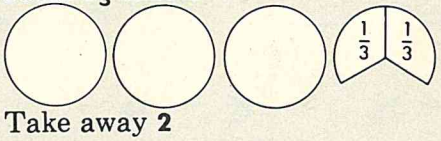
2 = $1\frac{6}{6}$

Change **2** to $1\frac{6}{6}$ — $2 = 1\frac{6}{6}$

Take away $1\frac{5}{6}$ — $1\frac{5}{6} = 1\frac{5}{6}$

The remainder is $\frac{1}{6}$ — $\frac{1}{6}$

From $3\frac{2}{3}$ take **2**



Take away **2**

The remainder is $1\frac{2}{3}$

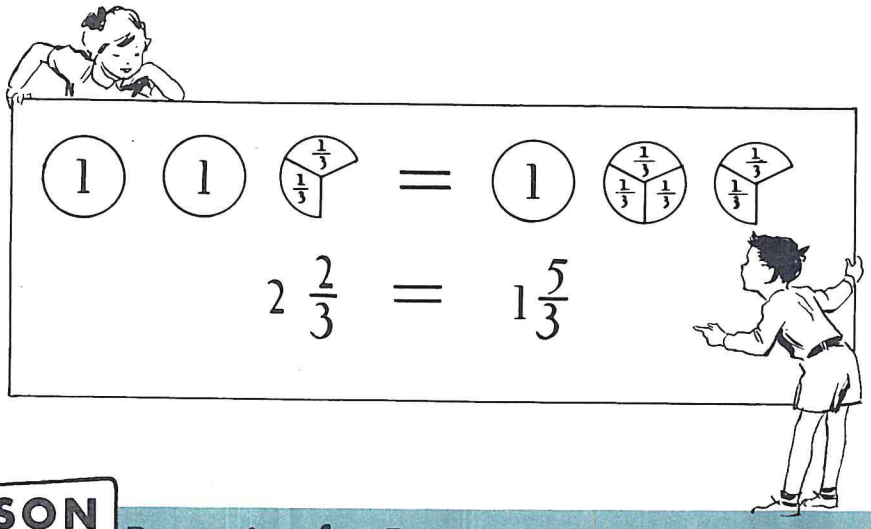
$3\frac{2}{3}$
$\underline{2}$
$1\frac{2}{3}$

To subtract:

1. $\frac{3}{8}$ from 6, change 6 to 5 and what fraction?
2. $\frac{7}{10}$ from 2, change 2 to 1 and what fraction?
3. $\frac{11}{12}$ from 9, change 9 to 8 and what fraction?
4. $1\frac{2}{3}$ from 8, change 8 to 7 and what fraction?
5. $4\frac{5}{16}$ from 7, change 7 to 6 and what fraction?
6. $3\frac{8}{9}$ from 4, change 4 to 3 and what fraction?
7. $2\frac{7}{20}$ from 6, change 6 to 5 and what fraction?
8. $7\frac{9}{25}$ from 9, change 9 to 8 and what fraction?
9. $2\frac{3}{4}$ from 8, change 8 to 7 and what fraction?
10. $8\frac{5}{6}$ from 11, change 11 to 10 and what fraction?
11. $4\frac{7}{8}$ from 9, change 9 to 8 and what fraction?
12. $2\frac{1}{3}$ from 5, change 5 to 4 and what fraction?

Subtract:

1.	$7 - \frac{10}{17}$	$5 - \frac{14}{15}$	$3 - \frac{9}{17}$	$12 - \frac{8}{11}$
2.	$2 - \frac{5}{9}$	$9 - \frac{3}{7}$	$8 - \frac{7}{12}$	$6 - \frac{5}{7}$
3.	$8 - 1\frac{3}{5}$	$7 - 2\frac{2}{3}$	$9 - 3\frac{4}{5}$	$6 - 2\frac{1}{5}$
4.	$9 - 3\frac{1}{8}$	$5 - 4\frac{3}{8}$	$2 - 1\frac{3}{4}$	$3 - 1\frac{3}{8}$
5.	$4 - 1\frac{3}{11}$	$3 - 2\frac{1}{2}$	$5 - 3\frac{2}{7}$	$7 - 1\frac{5}{9}$
6.	$5 - \frac{2}{3}$	$7 - \frac{3}{5}$	$8 - \frac{3}{7}$	$6 - \frac{1}{9}$
7.	$9\frac{3}{7} - 2$	$2\frac{1}{4} - 1$	$5\frac{3}{7} - 2$	$9\frac{4}{5} - 2$
8.	$8 - 3\frac{2}{3}$	$7 - 1\frac{3}{5}$	$9\frac{3}{8} - 3$	$4 - 1\frac{3}{11}$



LESSON 6. Preparing for Borrowing

Give the answers orally:

Change to a different form.

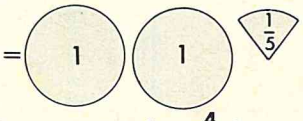
1. $3\frac{1}{8} = 2\frac{}{8}$ $\quad 2\frac{5}{8} = 1\frac{}{8}$
2. $4\frac{5}{9} = 3\frac{}{9}$ $\quad 6\frac{2}{7} = 5\frac{}{7}$
3. $6\frac{3}{4} = 5\frac{}{4}$ $\quad 8\frac{2}{3} = 7\frac{}{3}$
4. $2\frac{5}{6} = 1\frac{}{6}$ $\quad 7\frac{5}{9} = 6\frac{}{9}$
5. $7\frac{3}{8} = 6\frac{}{8}$ $\quad 4\frac{3}{5} = 3\frac{}{5}$
6. $8\frac{3}{7} = 7\frac{}{7}$ $\quad 9\frac{2}{5} = 8\frac{}{5}$
7. $5\frac{5}{9} = 4\frac{}{9}$ $\quad 2\frac{7}{8} = 1\frac{}{8}$
8. $9\frac{3}{7} = 8\frac{}{7}$ $\quad 4\frac{5}{6} = 3\frac{}{6}$
9. $3\frac{2}{3} = 2\frac{}{3}$ $\quad 8\frac{5}{9} = 7\frac{}{9}$
10. $5\frac{3}{8} = 4\frac{}{8}$ $\quad 2\frac{3}{4} = 1\frac{}{4}$
11. $6\frac{2}{3} = 5\frac{}{3}$ $\quad 2\frac{1}{2} = 1\frac{}{2}$
12. $9\frac{5}{6} = 8\frac{}{6}$ $\quad 4\frac{2}{7} = 3\frac{}{7}$
13. $5\frac{1}{8} = 4\frac{}{8}$ $\quad 8\frac{2}{3} = 7\frac{}{3}$
14. $3\frac{1}{5} = 2\frac{}{5}$ $\quad 7\frac{2}{7} = 6\frac{}{7}$

To take:		Change:	
1. $3\frac{5}{6}$	from $5\frac{1}{6}$	$5\frac{1}{6}$	to $4\frac{}{6}$
2. $4\frac{3}{7}$	from $8\frac{2}{7}$	$8\frac{2}{7}$	to $7\frac{}{7}$
3. $2\frac{5}{8}$	from $8\frac{3}{8}$	$8\frac{3}{8}$	to $7\frac{}{8}$
4. $3\frac{2}{5}$	from $5\frac{1}{5}$	$5\frac{1}{5}$	to $4\frac{}{5}$
5. $5\frac{4}{9}$	from $7\frac{2}{9}$	$7\frac{2}{9}$	to $6\frac{}{9}$
6. $1\frac{3}{8}$	from $7\frac{1}{8}$	$7\frac{1}{8}$	to $6\frac{}{8}$
7. $4\frac{5}{9}$	from $8\frac{4}{9}$	$8\frac{4}{9}$	to $7\frac{}{9}$
8. $6\frac{2}{3}$	from $8\frac{1}{3}$	$8\frac{1}{3}$	to $7\frac{}{3}$
9. $7\frac{3}{4}$	from $9\frac{1}{4}$	$9\frac{1}{4}$	to $8\frac{}{4}$
10. $8\frac{4}{5}$	from $10\frac{3}{5}$	$10\frac{3}{5}$	to $9\frac{}{5}$
11. $5\frac{5}{7}$	from $6\frac{3}{7}$	$6\frac{3}{7}$	to $5\frac{}{7}$
12. $3\frac{4}{9}$	from $5\frac{2}{9}$	$5\frac{2}{9}$	to $4\frac{}{9}$
13. $4\frac{5}{6}$	from $7\frac{1}{6}$	$7\frac{1}{6}$	to $6\frac{}{6}$
14. $6\frac{3}{8}$	from $9\frac{1}{8}$	$9\frac{1}{8}$	to $8\frac{}{8}$

LESSON 7. Borrowing With Like Denominators

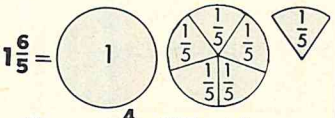
From $2\frac{1}{5}$ take $1\frac{4}{5}$

1.

$2\frac{1}{5} =$ 

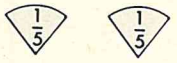
We cannot take $1\frac{4}{5}$ from $2\frac{1}{5}$ without changing $2\frac{1}{5}$ to $1\frac{6}{5}$.

2.

$1\frac{6}{5} =$ 

Cover $1\frac{4}{5}$. What is the remainder?

3.



The remainder is $\frac{2}{5}$

4.

$$2\tfrac{1}{5} = 1\tfrac{6}{5}$$
$$-1\tfrac{4}{5} = 1\tfrac{4}{5}$$
$$\tfrac{2}{5}$$

Subtract:

1.	$5\frac{1}{3}$	$4\frac{2}{5}$	$6\frac{3}{7}$	$7\frac{3}{8}$
	$2\frac{2}{3}$	$1\frac{3}{5}$	$2\frac{5}{7}$	$3\frac{6}{8}$
2.	$5\frac{4}{9}$	$4\frac{1}{3}$	$6\frac{1}{4}$	$8\frac{1}{5}$
	$2\frac{8}{9}$	$1\frac{2}{3}$	$5\frac{2}{4}$	$2\frac{4}{5}$
3.	$9\frac{1}{4}$	$2\frac{2}{7}$	$9\frac{1}{7}$	$6\frac{2}{5}$
	$2\frac{2}{4}$	$1\frac{5}{7}$	$3\frac{2}{7}$	$1\frac{4}{5}$
4.	$8\frac{4}{7}$	$7\frac{1}{11}$	$2\frac{2}{9}$	$4\frac{1}{5}$
	$2\frac{6}{7}$	$4\frac{3}{11}$	$1\frac{7}{9}$	$1\frac{2}{5}$
5.	$9\frac{1}{7}$	$5\frac{2}{7}$	$5\frac{2}{5}$	$8\frac{1}{9}$
	$4\frac{2}{7}$	$1\frac{3}{7}$	$1\frac{4}{5}$	$3\frac{8}{9}$
6.	$4\frac{1}{3}$	$2\frac{2}{11}$	$4\frac{1}{13}$	$7\frac{2}{7}$
	$2\frac{2}{3}$	$1\frac{5}{11}$	$2\frac{3}{13}$	$2\frac{5}{7}$
7.	$8\frac{1}{5}$	$6\frac{4}{9}$	$5\frac{1}{3}$	$3\frac{3}{7}$
	$7\frac{4}{5}$	$3\frac{8}{9}$	$2\frac{2}{3}$	$2\frac{6}{7}$
8.	$9\frac{3}{11}$	$4\frac{1}{10}$	$7\frac{1}{12}$	$5\frac{1}{9}$
	$2\frac{9}{11}$	$1\frac{2}{10}$	$2\frac{8}{12}$	$2\frac{2}{9}$

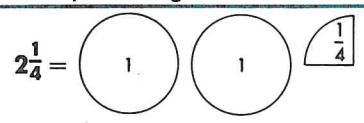
Subtract:

1.	$3\frac{5}{9}$	$7\frac{3}{7}$	$6\frac{2}{5}$	$7\frac{2}{9}$
	$2\frac{7}{9}$	$5\frac{5}{7}$	$3\frac{4}{5}$	$3\frac{4}{9}$
2.	$8\frac{1}{5}$	$2\frac{1}{7}$	$4\frac{1}{5}$	$6\frac{1}{11}$
	$3\frac{2}{5}$	$1\frac{3}{7}$	$2\frac{3}{5}$	$3\frac{4}{11}$
3.	$5\frac{3}{13}$	$8\frac{1}{3}$	$5\frac{2}{9}$	$7\frac{4}{7}$
	$2\frac{5}{13}$	$6\frac{2}{3}$	$4\frac{7}{9}$	$5\frac{6}{7}$
4.	$9\frac{4}{15}$	$9\frac{1}{6}$	$8\frac{1}{9}$	$6\frac{3}{5}$
	$2\frac{11}{15}$	$3\frac{2}{6}$	$5\frac{5}{9}$	$5\frac{4}{5}$
5.	$5\frac{4}{10}$	$7\frac{1}{3}$	$4\frac{1}{11}$	$4\frac{2}{8}$
	$3\frac{7}{10}$	$3\frac{2}{3}$	$2\frac{5}{11}$	$3\frac{7}{8}$
6.	$2\frac{8}{15}$	$5\frac{4}{9}$	$8\frac{2}{9}$	$7\frac{1}{18}$
	$1\frac{12}{15}$	$2\frac{8}{9}$	$5\frac{4}{9}$	$4\frac{12}{18}$
7.	$6\frac{3}{15}$	$3\frac{5}{20}$	$9\frac{6}{18}$	$6\frac{1}{8}$
	$4\frac{14}{15}$	$1\frac{18}{20}$	$7\frac{7}{18}$	$5\frac{6}{8}$
8.	$9\frac{1}{4}$	$2\frac{1}{16}$	$4\frac{1}{12}$	$8\frac{1}{6}$
	$8\frac{2}{4}$	$1\frac{4}{16}$	$3\frac{8}{12}$	$2\frac{2}{6}$

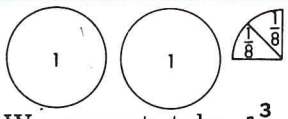
LESSON 8. Borrowing With Related Denominators

Before we can add or subtract fractions, they must have a common denominator.

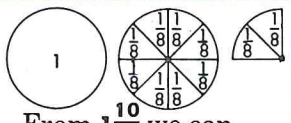
From $2\frac{1}{4}$ take $1\frac{3}{8}$.



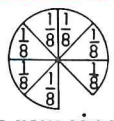
Change $2\frac{1}{4}$ to $2\frac{2}{8}$.



We cannot take $1\frac{3}{8}$ away without changing $2\frac{2}{8}$ to $1\frac{10}{8}$.



From $1\frac{10}{8}$ we can take $1\frac{3}{8}$.



The remainder is $\frac{7}{8}$.

Study the following example:

A.

$$2\tfrac{1}{4} = 2\tfrac{2}{8} = 1\tfrac{10}{8}$$
$$-1\tfrac{3}{8} = 1\tfrac{3}{8} = 1\tfrac{3}{8}$$
$$\tfrac{7}{8} \text{ remainder}$$

B.

$$7\tfrac{1}{6} = 7\tfrac{1}{6} = 6\tfrac{7}{6}$$
$$-2\tfrac{2}{3} = 2\tfrac{4}{6} = 2\tfrac{4}{6}$$
$$4\tfrac{3}{6} = 4\tfrac{1}{2} \text{ remainder}$$

Subtract:

1.	$7\frac{1}{2}$ $-5\frac{3}{4}$	$9\frac{3}{10}$ $-1\frac{3}{5}$	$8\frac{1}{3}$ $-4\frac{5}{12}$	$6\frac{1}{4}$ $-2\frac{7}{8}$
2.	$7\frac{1}{4}$ $-6\frac{5}{8}$	$5\frac{1}{16}$ $-4\frac{3}{4}$	$4\frac{1}{8}$ $-2\frac{3}{4}$	$6\frac{3}{4}$ $-5\frac{7}{8}$
3.	$4\frac{1}{8}$ $-3\frac{3}{4}$	$5\frac{1}{4}$ $-3\frac{7}{8}$	$6\frac{2}{3}$ $-2\frac{5}{6}$	$7\frac{5}{6}$ $-2\frac{11}{12}$
4.	$8\frac{5}{8}$ $-4\frac{15}{16}$	$9\frac{1}{10}$ $-3\frac{2}{5}$	$8\frac{1}{14}$ $-2\frac{3}{7}$	$4\frac{1}{5}$ $-3\frac{7}{15}$
5.	$6\frac{3}{20}$ $-2\frac{3}{5}$	$7\frac{1}{3}$ $-2\frac{7}{15}$	$5\frac{2}{15}$ $-2\frac{1}{5}$	$4\frac{1}{12}$ $-1\frac{2}{3}$
6.	$8\frac{1}{6}$ $-5\frac{1}{3}$	$7\frac{3}{20}$ $-4\frac{3}{5}$	$2\frac{1}{5}$ $-1\frac{3}{10}$	$9\frac{7}{20}$ $-7\frac{2}{5}$

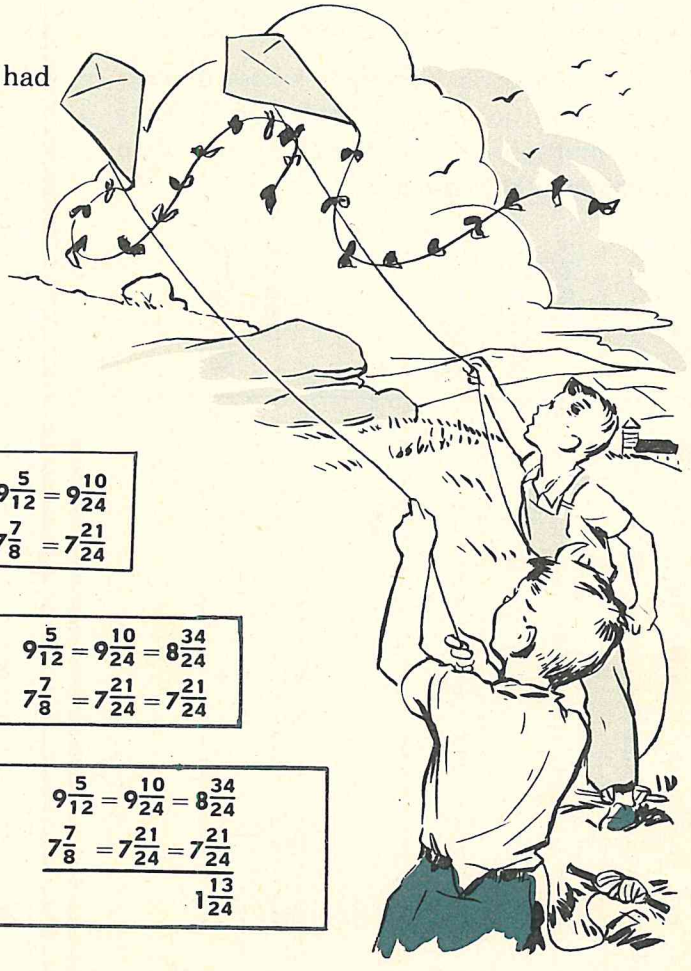
Subtract:

1.	$9\frac{1}{6}$ $-5\frac{2}{3}$	$4\frac{1}{3}$ $-3\frac{5}{6}$	$8\frac{2}{3}$ $-7\frac{11}{12}$	$6\frac{1}{2}$ $-3\frac{5}{6}$
2.	$7\frac{5}{12}$ $-2\frac{3}{4}$	$9\frac{1}{2}$ $-4\frac{7}{10}$	$2\frac{1}{2}$ $-1\frac{7}{10}$	$5\frac{1}{2}$ $-4\frac{5}{6}$
3.	$7\frac{1}{3}$ $-3\frac{5}{6}$	$9\frac{1}{4}$ $-3\frac{5}{12}$	$6\frac{3}{10}$ $-2\frac{4}{5}$	$5\frac{3}{20}$ $-2\frac{1}{4}$
4.	$4\frac{1}{10}$ $-2\frac{3}{5}$	$8\frac{5}{12}$ $-4\frac{2}{3}$	$6\frac{1}{4}$ $-3\frac{7}{12}$	$5\frac{1}{6}$ $-2\frac{5}{18}$
5.	$2\frac{3}{20}$ $-1\frac{1}{4}$	$5\frac{1}{4}$ $-3\frac{5}{12}$	$9\frac{1}{3}$ $-4\frac{7}{12}$	$6\frac{1}{18}$ $-2\frac{5}{9}$
6.	$3\frac{1}{6}$ $-1\frac{2}{3}$	$7\frac{3}{10}$ $-2\frac{4}{5}$	$8\frac{1}{3}$ $-4\frac{5}{6}$	$7\frac{1}{18}$ $-2\frac{5}{9}$

LESSON 9. Borrowing With Unlike Denominators

John had $9\frac{5}{12}$ yards of string for his kite. Bill had $7\frac{7}{8}$ yards. How much more string had John than Bill?

From $9\frac{5}{12}$ take $7\frac{7}{8}$.



Step 1. Find the L.C.M. of 8 and 12.

2 | 8 — 12 2 | 4 — 6 2 — 3 $2\times2\times2\times3=24$ L.C.M. $=24$	$9\frac{5}{12}=9\frac{}{24}$ $7\frac{7}{8}=7\frac{}{24}$

Step 2.

12 into 24, 2. Two 5's are 10. 8 into 24, 3. Three 7's are 21.	$9\frac{5}{12}=9\frac{10}{24}$ $7\frac{7}{8}=7\frac{21}{24}$

Step 3.

$\frac{21}{24}$ cannot be taken from $\frac{10}{24}$. Change $9\frac{10}{24}$ to $8\frac{34}{24}$.	$9\frac{5}{12}=9\frac{10}{24}=8\frac{34}{24}$ $7\frac{7}{8}=7\frac{21}{24}=7\frac{21}{24}$

Step 4.

Subtract $\frac{21}{24}$ from $\frac{34}{24}$, $\frac{13}{24}$ Subtract 7 from 8, 1	$9\frac{5}{12}=9\frac{10}{24}=8\frac{34}{24}$ $7\frac{7}{8}=7\frac{21}{24}=7\frac{21}{24}$ $1\frac{13}{24}$

John had $1\frac{13}{24}$ yards more than Bill.

Subtract:

1.	$5\frac{1}{4}$ $3\frac{5}{6}$	$9\frac{5}{12}$ $7\frac{5}{8}$	$6\frac{1}{6}$ $4\frac{3}{8}$	$8\frac{1}{9}$ $4\frac{5}{6}$
2.	$6\frac{1}{8}$ $4\frac{5}{6}$	$8\frac{1}{12}$ $2\frac{5}{9}$	$9\frac{4}{15}$ $7\frac{9}{10}$	$3\frac{1}{12}$ $1\frac{1}{8}$
3.	$6\frac{1}{6}$ $4\frac{9}{14}$	$9\frac{3}{14}$ $2\frac{1}{4}$	$5\frac{1}{18}$ $4\frac{3}{4}$	$9\frac{1}{10}$ $6\frac{4}{15}$
4.	$7\frac{1}{10}$ $4\frac{2}{15}$	$7\frac{2}{9}$ $3\frac{5}{6}$	$9\frac{2}{15}$ $5\frac{11}{20}$	$8\frac{3}{10}$ $6\frac{7}{8}$
5.	$9\frac{5}{18}$ $8\frac{5}{12}$	$8\frac{5}{6}$ $4\frac{7}{8}$	$7\frac{5}{12}$ $5\frac{7}{16}$	$6\frac{3}{8}$ $4\frac{7}{12}$
6.	$8\frac{1}{8}$ $7\frac{5}{12}$	$5\frac{3}{4}$ $3\frac{5}{6}$	$6\frac{1}{4}$ $1\frac{9}{14}$	$7\frac{7}{8}$ $2\frac{9}{10}$
7.	$8\frac{2}{3}$ $4\frac{5}{6}$	$4\frac{5}{6}$ $2\frac{7}{8}$	$9\frac{3}{4}$ $1\frac{7}{8}$	$5\frac{1}{6}$ $3\frac{1}{2}$
8.	$8\frac{1}{8}$ $3\frac{1}{6}$	$9\frac{7}{8}$ $4\frac{9}{10}$	$8\frac{5}{9}$ $6\frac{5}{6}$	$9\frac{5}{6}$ $3\frac{7}{8}$

LESSON 10. More Work With Fractions

Denominators With No Common Factor:

To add or subtract fractions whose denominators have no common factors, such as $\frac{3}{4}$ and $\frac{2}{3}$, multiply the denominators to obtain the common denominator.

$$\begin{array}{r} \frac{3}{4}=\frac{9}{12} \\ +\frac{2}{3}=\frac{8}{12} \\ \hline \frac{17}{12}=1\frac{5}{12} \end{array} \qquad \begin{array}{r} \frac{5}{8}=\frac{25}{40} \\ -\frac{3}{5}=\frac{24}{40} \\ \hline \frac{1}{40} \end{array}$$

Comparing Fractions:

Which fraction has the greater value

$$\frac{2}{3} \text{ or } \frac{3}{4}$$

To discover which is greater in value, change the fractions to the same denominator.

$$\frac{2}{3}=\frac{8}{12} \qquad \frac{3}{4}=\frac{9}{12}$$

Therefore $\frac{3}{4}$ is greater than $\frac{2}{3}$.

Watch the signs:

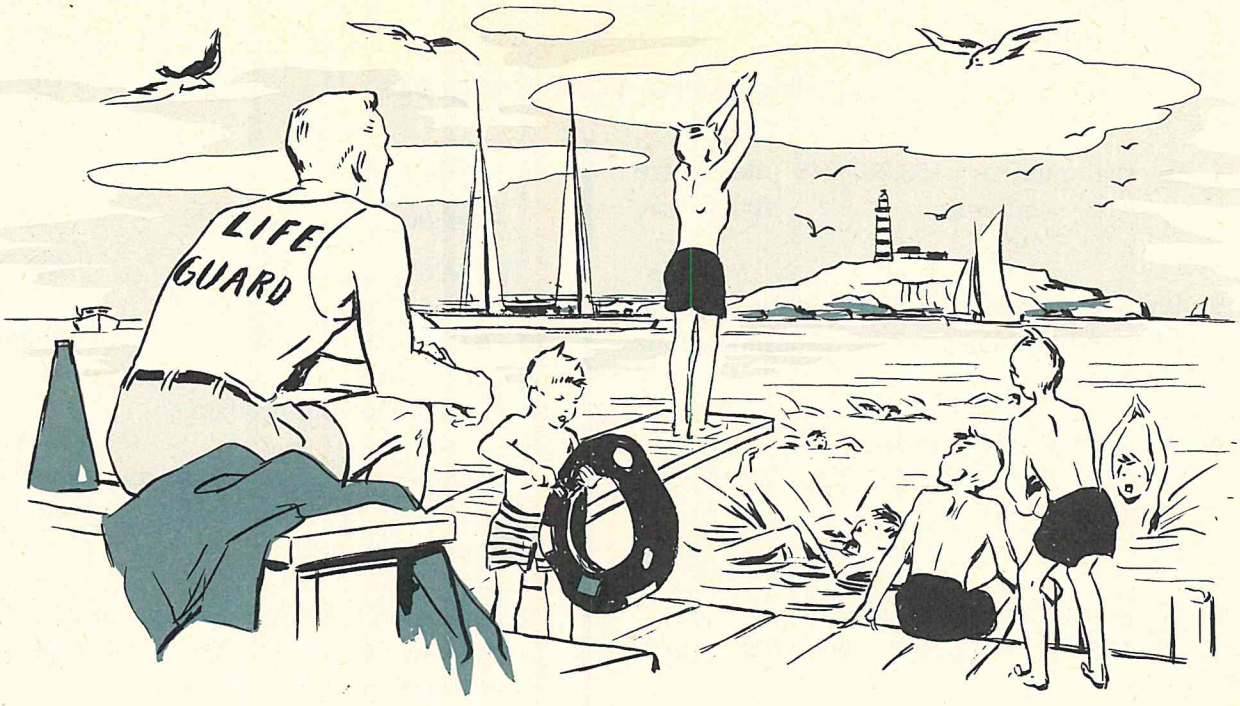
1.	$\frac{5}{6}+\frac{3}{5}$	$\frac{2}{3}-\frac{1}{5}$	$3\frac{1}{8}+1\frac{3}{5}$
2.	$\frac{7}{9}-\frac{1}{2}$	$\frac{5}{7}+\frac{3}{4}$	$2\frac{5}{9}-1\frac{1}{5}$
3.	$\frac{3}{4}-\frac{2}{3}$	$\frac{4}{5}-\frac{1}{4}$	$6\frac{2}{3}-4\frac{1}{2}$
4.	$\frac{3}{4}-\frac{5}{9}$	$\frac{5}{6}+\frac{1}{7}$	$5\frac{3}{7}-2\frac{1}{2}$
5.	$\frac{3}{5}-\frac{1}{2}$	$\frac{9}{10}-\frac{1}{3}$	$2\frac{1}{3}-1\frac{3}{7}$
6.	$\frac{7}{8}-\frac{3}{5}$	$\frac{2}{11}+\frac{3}{4}$	$6\frac{7}{10}+4\frac{2}{3}$
7.	$\frac{3}{7}+\frac{3}{5}$	$\frac{7}{11}-\frac{1}{2}$	$4\frac{5}{12}-3\frac{4}{5}$
8.	$\frac{1}{3}-\frac{3}{20}$	$\frac{8}{15}+\frac{3}{4}$	$8\frac{5}{13}-2\frac{1}{2}$
9.	$\frac{4}{5}+\frac{3}{11}$	$\frac{4}{7}-\frac{3}{8}$	$6\frac{1}{2}-1\frac{4}{15}$
10.	$\frac{2}{3}-\frac{9}{16}$	$\frac{2}{3}+\frac{7}{13}$	$9\frac{7}{10}+3\frac{4}{7}$

Which fraction has the greater value?

1.	$\frac{5}{6}$ or $\frac{3}{4}$	$\frac{5}{9}$ or $\frac{5}{8}$	$\frac{5}{8}$ or $\frac{2}{3}$
2.	$\frac{2}{7}$ or $\frac{1}{3}$	$\frac{4}{5}$ or $\frac{5}{6}$	$\frac{4}{9}$ or $\frac{5}{12}$
3.	$\frac{7}{8}$ or $\frac{5}{6}$	$\frac{3}{8}$ or $\frac{3}{4}$	$\frac{7}{10}$ or $\frac{8}{15}$
4.	$\frac{1}{3}$ or $\frac{1}{4}$	$\frac{7}{10}$ or $\frac{5}{9}$	$\frac{13}{20}$ or $\frac{15}{40}$
5.	$\frac{1}{6}$ or $\frac{1}{5}$	$\frac{7}{9}$ or $\frac{7}{12}$	$\frac{3}{7}$ or $\frac{4}{9}$
6.	$\frac{11}{15}$ or $\frac{8}{9}$	$\frac{2}{3}$ or $\frac{3}{5}$	$\frac{3}{16}$ or $\frac{5}{8}$
7.	$\frac{3}{5}$ or $\frac{3}{4}$	$\frac{4}{7}$ or $\frac{4}{9}$	$\frac{5}{8}$ or $\frac{3}{5}$
8.	$\frac{9}{10}$ or $\frac{6}{7}$	$\frac{2}{5}$ or $\frac{3}{10}$	$\frac{4}{5}$ or $\frac{7}{9}$
9.	$\frac{3}{16}$ or $\frac{3}{20}$	$\frac{5}{12}$ or $\frac{7}{16}$	$\frac{7}{5}$ or $\frac{9}{10}$
10.	$\frac{11}{15}$ or $\frac{7}{10}$	$\frac{3}{4}$ or $\frac{8}{9}$	$\frac{7}{24}$ or $\frac{5}{16}$

Solve:

1. Agnes has $3\frac{1}{2}$ yards of lace. If she uses $1\frac{1}{3}$ yards, how many yards has she left?
2. Alice bought $5\frac{1}{4}$ yards of white silk and $1\frac{1}{3}$ yd. of blue silk. How many yards of silk did she buy?
3. Anthony needs $6\frac{7}{8}$ yards of wire. He has $4\frac{1}{3}$ yards. How much more wire does he need?
4. Mother bought two chickens. One weighed $5\frac{7}{10}$ pounds, and the other weighed $6\frac{1}{3}$ pounds. What was their total weight?



Practice With Problems

Solve the following problems:

1. Green Valley Pool is $2\frac{1}{2}$ miles from John's home and $1\frac{3}{4}$ miles from Samuel's home. How much nearer to the pool does Samuel live than John?

2. The big boys' pool is $10\frac{1}{2}$ yd. long. The little boys' pool is $8\frac{2}{3}$ yd. long. How much longer than one pool is the other?

3. One diving board is $3\frac{2}{3}$ feet long. Another is $4\frac{1}{8}$ feet long. Find the difference in the lengths of the two diving boards.

4. Green Valley Pool is $12\frac{3}{4}$ yd. long and $9\frac{3}{5}$ yard wide. How much greater is the length than the width?

5. The indoor pool in our neighborhood is open for $4\frac{2}{5}$ hours in the afternoon and $3\frac{3}{5}$ hours in the evening. For how many hours is the pool open each day?

6. The railing around one swimming pool is $15\frac{1}{8}$ yards long. The railing around another pool is only $12\frac{1}{6}$ yards long. What is the difference in the lengths of the two railings?

7. There are two sails on Mr. Gorham's boat. One measures $5\frac{3}{4}$ feet wide. The other is $6\frac{5}{6}$ feet wide. What is the width of the two sails together?

8. Thomas and James are taking part in the annual swimming race. If Thomas swims one mile in $3\frac{3}{4}$ minutes and James swims one mile in $3\frac{1}{3}$ minutes. By how many seconds did James win the race?

9. The deepest part of Green Valley Pool is $10\frac{1}{3}$ ft. The deepest section of Maple Shade Pool is $8\frac{2}{3}$ ft. What is the difference between the depths of the two pools?

10. If Charles swims $1\frac{1}{4}$ hours on Saturday, $1\frac{3}{4}$ hours on Sunday and 2 hours on Monday, how many hours will he swim altogether?

Measure Your Progress

1. In the number 158,367,249 there are (?) millions, (?) thousands, (?) units.

2. Write in figures: Two hundred five million, six hundred ninety-eight thousand, four hundred three.

3. Write in Arabic numbers:
C, CLV, D, DCX, DXXX, M, MCD, MDC.

4. Write in Roman numerals:
75, 105, 260, 720, 900, 1000, 1600, 1950.

5. Add: $125+36+47+105+58+90+200$
$\$15.75+\$20+\$.85+\$6.10+\$.50$
$\$2{,}000+\$1{,}500+\$5{,}110+\$25$

$\frac{5}{8}+\frac{6}{8}$ $\quad\quad$ $\frac{4}{6}+\frac{9}{6}$ $\quad\quad$ $\frac{1}{3}+\frac{1}{3}$

$\frac{1}{12}+\frac{2}{12}+\frac{5}{12}$ $\quad\quad$ $\frac{1}{9}+\frac{4}{9}+\frac{5}{9}$

6. Subtract:

250	37015	\$500.00
78	4983	198.54

$12\frac{7}{9}-6\frac{4}{9}$ $\quad\quad$ $7\frac{5}{8}-4\frac{5}{8}$

$2\frac{9}{10}-1\frac{2}{5}$ $\quad\quad$ $6\frac{7}{12}-2\frac{1}{3}$

7. Multiply:

80	704	5000
$\times 9$	$\times 87$	$\times 465$

\$250	\$60.50	\$53.80
76	5.90	14.00

8. Find the L.C.M. of:
3, 9, 12 $\quad\quad$ 4, 8, 12
9, 4, 6 $\quad\quad$ 3, 4, 6

9. Divide:

$6\overline{)4806}$	$8\overline{)7232}$	$9\overline{)634}$
$25\overline{)225}$	$98\overline{)9900}$	$64\overline{)276}$

10. $73\overline{)\$57.75}$ $\quad\quad$ $\$5.28\overline{)\$371.60}$ $\quad\quad$ $89\overline{)3466}$

Solve the following problems:

1. Margaret weighed $57\frac{1}{4}$ lb. in August and $58\frac{1}{2}$ lb. in September. How much did she gain in a month?

2. One train is going $56\frac{1}{4}$ m.p.h. and another is going $54\frac{1}{20}$ m.p.h. What is the difference in their speed?

3. Tom worked $3\frac{3}{4}$ hr. on Monday, $2\frac{1}{2}$ hr. on Tuesday, and $4\frac{1}{12}$ hr. on Wednesday. Find the number of hours he worked in the 3 days.

4. Mary rode her bicycle $7\frac{5}{8}$ miles on Monday, and $6\frac{3}{4}$ miles on Tuesday. How far did she ride in the two days?

5. The length of a cruiser is 540 ft. How many yards is that?

6. If one block of granite weighs 160 pounds, what will be the weight of a block 25 times as large?

7. 5,648 pecks equal how many bushels?

8. 25 schools entered The Mission Poster Contest. If there were 650 posters submitted, how many was that per school?

9. From \$968.18 take \$359.98.

10. If a man's savings amounted to \$240 for a period of 6 months, how much was that per week?

Practice With Problems

1. During one day of their journey to Bethlehem, the Wise Men travelled $14\frac{1}{2}$ miles. The next day they travelled $23\frac{1}{3}$ miles. How many miles was this?

2. The Wise Men spent $9\frac{3}{4}$ days crossing one desert and $14\frac{5}{7}$ days crossing another. How many days was this altogether?

3. One Wise Man's gifts weighed $18\frac{2}{5}$ lb., another's $22\frac{1}{2}$ lb., and the third's $9\frac{1}{4}$ lb. What was the weight of their gifts?

4. If the three Kings journeyed 819 miles in 39 days, how many miles did they average in 1 day?

5. Ben, a little shepherd boy, stayed for $2\frac{2}{5}$ hours watching the Christ Child. David, his friend watched for 3 hours. How much longer than Ben did David watch?

6. Our Lady let David hold the Christ Child in his arms for $15\frac{2}{3}$ minutes. Ben held Him for $18\frac{3}{4}$ minutes. For how many minutes did the boys hold the Christ Child?

7. St. Joseph spent $40\frac{3}{5}$ minutes putting the stable in order and $35\frac{5}{6}$ minutes securing food for Our Lady and the Christ Child. How much more time did he spend putting the stable in order than in securing the food?

8. If one King was $6\frac{1}{6}$ ft. tall, and another was $5\frac{2}{3}$ ft. tall, what was the difference in their height?

9. If the shepherd children could walk $3\frac{1}{3}$ miles in 80 minutes, how long did it take them to walk 1 mile?

10. David brought Our Lady $2\frac{1}{8}$ lb. of cake and Miriam brought $1\frac{5}{6}$ lb. of honey. How much more than the honey did the cake weigh?

UNIT 4 Test

Write the answers on your test paper:

Part I

1.	$\frac{3}{8}$ $+\frac{5}{6}$	$\frac{7}{9}$ $+\frac{5}{12}$	$\frac{8}{9}$ $-\frac{5}{6}$	$3\frac{1}{6}$ $-2\frac{5}{9}$
2.	$\frac{7}{8}$ $+\frac{1}{3}$	$\frac{5}{7}$ $-\frac{1}{4}$	$\frac{6}{7}$ $+\frac{4}{5}$	$7\frac{1}{4}$ $-4\frac{2}{3}$
3.	$4\frac{1}{9}$ $2\frac{1}{3}$ $3\frac{1}{4}$	$6\frac{5}{8}$ $5\frac{1}{4}$ $1\frac{1}{6}$	$2\frac{5}{6}$ $3\frac{1}{9}$ $5\frac{7}{12}$	$3\frac{2}{5}$ $4\frac{1}{15}$ $2\frac{7}{10}$

4. From $\frac{1}{2}$ take $\frac{5}{12}$. From $3\frac{1}{5}$ take $1\frac{4}{9}$.

5. Take $\frac{1}{4}$ from $\frac{4}{9}$. From $8\frac{2}{3}$ take $\frac{3}{4}$.

Part II

1. Bob weighs $68\frac{3}{4}$ pounds. Jack weighs $72\frac{5}{6}$ pounds. How much more than Bob does Jack weigh?

2. Madge practiced on the piano $\frac{3}{4}$ hour on Monday and $1\frac{1}{3}$ hours on Tuesday. How long did she practice in the two days?

3. During the last three weeks the Dunn family used $3\frac{1}{2}$ pounds of butter, $2\frac{3}{8}$ pounds, and $2\frac{5}{6}$ pounds. How many pounds did they use altogether?

4. Mary is $4\frac{1}{3}$ feet tall. Nancy is $3\frac{7}{8}$ feet tall. How much taller than Nancy is Mary?

5. Peter traveled $3\frac{5}{6}$ miles on his bicycle and Tom traveled $5\frac{3}{4}$ miles. How much farther than Peter did Tom travel?

Part III

Write in figures:

1. Five and three-eighths
2. Six and seven-ninths
3. Four and eight-elevenths
4. Nine and four-sevenths
5. Seven and five-sixths

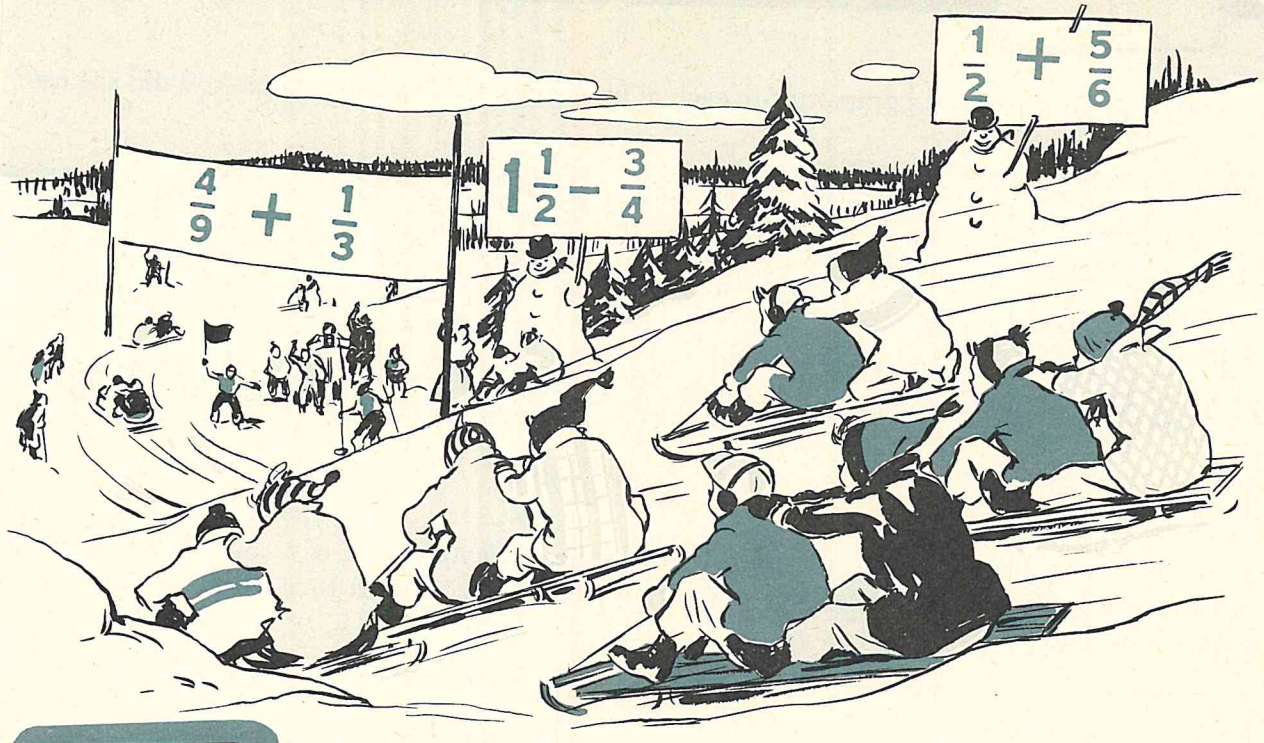
Write in words:

6. $6\frac{1}{2}$	$5\frac{3}{4}$
7. $8\frac{2}{9}$	$1\frac{8}{9}$
8. $4\frac{1}{5}$	$4\frac{7}{10}$
9. $2\frac{3}{4}$	$7\frac{3}{5}$
10. $4\frac{5}{8}$	$3\frac{6}{7}$

Part IV

Match Column B with Column A:

A.	B.
1. (?) 3 x 8	a. C. D. 36
2. (?) 7	b. composite number
3. (?) 3 and 6	c. $\frac{3}{10}$
4. (?) 6	d. factors
5. (?) $7\frac{3}{8}$	e. common factor 3
6. (?) 24	f. prime number
7. (?) $\frac{3}{4}+\frac{5}{9}$	g. $4\frac{1}{4}$
8. (?) $1-\frac{7}{10}$	h. C. D. 24
9. (?) $3\frac{10}{8}$	i. multiple of 8 and 3
10. (?) $\frac{5}{6}-\frac{3}{8}$	j. $6\frac{11}{8}$



UNIT 5 ● MULTIPLICATION AND DIVISION OF FRACTIONS

How Well Do You Remember?

1. The sum of $\frac{3}{4}$ and $\frac{5}{8}$ is (?) .

2. Fractions such as $\frac{5}{9}$ and $\frac{1}{9}$ have (?) denominators.

3. Fractions such as $\frac{2}{5}$ and $\frac{3}{4}$ have (?) denominators.

4. The least common denominator of $\frac{8}{9}$ and $\frac{5}{6}$ is (?) .

5. Before I can subtract $\frac{3}{5}$ from 1, I must change 1 to the fraction (?) . The remainder will be (?)

6. When I add $\frac{3}{4}$ and $\frac{7}{6}$, the sum is $\frac{}{12}$. This is an (?) fraction and it must be changed to (?) which is a (?) number.

7. The mixed number $3\frac{2}{5}$ can be changed to the form $2\frac{}{5}$ without changing the value of the fraction.

8. (a) $4\frac{5}{8} = 3\frac{?}{8}$ (b) $7\frac{3}{5} = 6\frac{?}{5}$

9. (a) $4\frac{5}{8} - 2\frac{7}{8}$ (b) $7\frac{3}{5} - 2\frac{4}{5}$

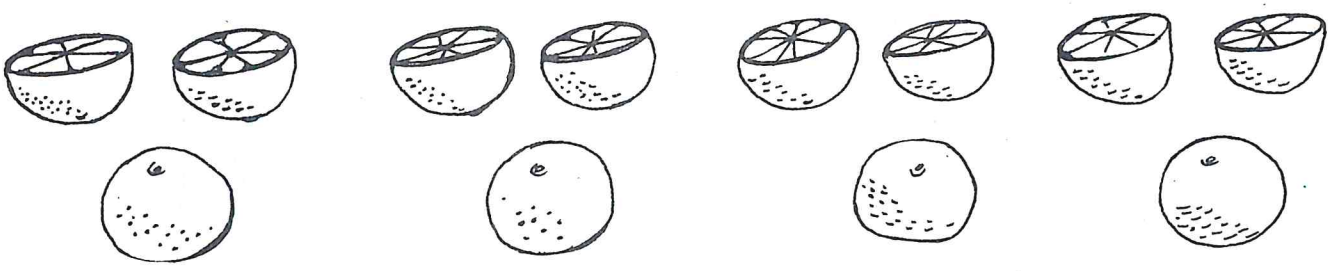
10. $\frac{1}{4}+\frac{1}{4}+\frac{1}{4}+\frac{1}{4}+\frac{1}{4}=\frac{5}{4}$ or $1\frac{1}{4}$. A shorter way of adding the same fraction over and over is to multiply $5\times\frac{1}{4}$ which equals (?) .

11. The integer 5 may be expressed as $\frac{5}{1}$. Every whole number may be given a (?) of 1 whenever it is helpful to do so.

12. $\frac{3}{5}\times\frac{2}{7}=\frac{6}{35}$. The new numerator 6 is the product of (?) and (?) . The new denominator 35 is the product of (?) and (?)

LESSON 1. Multiplication of Fractions

At breakfast, Mother gave $\frac{1}{2}$ grapefruit to each of her 8 guests. How many grapefruit did she use?



$$8 \times \frac{1}{2} = \frac{8}{2} \text{ or } 4$$

8 is a whole number or an integer. Every integer has a denominator of **1**, but usually the **1** is not expressed. In the multiplication of fractions, we find it helpful to use the whole number with its denominator **1**.

A. $8 \times \frac{1}{2}$

$\frac{8}{1} \times \frac{1}{2} = \frac{8}{2} = 4$

B. $7 \times \frac{3}{4}$

$\frac{7}{1} \times \frac{3}{4} = \frac{21}{4}$ or $5\frac{1}{4}$

Multiply the numerators for a new numerator. Multiply the denominators for a new denominator. If the product is an improper fraction, change it to a whole number as in **A**, or to a mixed number as in **B**.

Multiply:

1.	$2 \times \frac{1}{2}$	$5 \times \frac{1}{6}$	$3 \times \frac{1}{4}$
2.	$2 \times \frac{1}{11}$	$7 \times \frac{1}{9}$	$2 \times \frac{1}{3}$
3.	$5 \times \frac{1}{7}$	$2 \times \frac{2}{5}$	$2 \times \frac{1}{9}$
4.	$8 \times \frac{1}{11}$	$4 \times \frac{1}{7}$	$6 \times \frac{1}{7}$
5.	$2 \times \frac{2}{9}$	$3 \times \frac{2}{7}$	$4 \times \frac{1}{15}$
6.	$6 \times \frac{1}{17}$	$3 \times \frac{3}{5}$	$5 \times \frac{1}{3}$
7.	$4 \times \frac{1}{3}$	$2 \times \frac{3}{5}$	$4 \times \frac{3}{7}$
8.	$6 \times \frac{2}{7}$	$8 \times \frac{2}{9}$	$6 \times \frac{4}{7}$
9.	$6 \times \frac{4}{5}$	$9 \times \frac{1}{8}$	$5 \times \frac{3}{8}$
10.	$7 \times \frac{4}{5}$	$8 \times \frac{3}{7}$	$6 \times \frac{2}{5}$
11.	$5 \times \frac{1}{8}$	$4 \times \frac{2}{3}$	$3 \times \frac{1}{2}$
12.	$6 \times \frac{1}{8}$	$4 \times \frac{3}{8}$	$5 \times \frac{3}{5}$
13.	$7 \times \frac{2}{5}$	$8 \times \frac{1}{7}$	$9 \times \frac{3}{4}$
14.	$7 \times \frac{2}{9}$	$5 \times \frac{2}{7}$	$5 \times \frac{5}{6}$
15.	$12 \times \frac{1}{4}$	$6 \times \frac{1}{3}$	$7 \times \frac{3}{5}$
16.	$9 \times \frac{4}{9}$	$15 \times \frac{1}{5}$	$8 \times \frac{3}{8}$
17.	$12 \times \frac{5}{6}$	$10 \times \frac{1}{5}$	$7 \times \frac{4}{7}$
18.	$7 \times \frac{1}{7}$	$14 \times \frac{2}{7}$	$5 \times \frac{4}{5}$

Products in Pairs

Whole Numbers	Fractions	
$3 \times 2 = 6$	$3 \times \frac{1}{4}$ means $\frac{3}{1} \times \frac{1}{4} = \frac{3}{4}$	$7 \times \frac{3}{5}$ means $\frac{7}{1} \times \frac{3}{5} = \frac{21}{5}$ or $4\frac{1}{5}$
$2 \times 3 = 6$	$\frac{1}{4} \times 3$ means $\frac{1}{4} \times \frac{3}{1} = \frac{3}{4}$	$\frac{3}{5} \times 7$ means $\frac{3}{5} \times \frac{7}{1} = \frac{21}{5}$ or $4\frac{1}{5}$

To multiply fractions:
1. Multiply the numerators for a new numerator.
2. Multiply the denominators for a new denominator.
3. If necessary change the product to a mixed number.

LESSON 2. Multiplying a Fraction by a Whole Number

Multiply:

1.	$\frac{1}{10} \times 3$	$\frac{1}{4} \times 5$	$\frac{3}{4} \times 9$
2.	$\frac{1}{11} \times 4$	$\frac{4}{15} \times 7$	$\frac{6}{7} \times 3$
3.	$\frac{1}{7} \times 4$	$\frac{5}{6} \times 5$	$\frac{5}{12} \times 7$
4.	$\frac{2}{5} \times 2$	$\frac{3}{4} \times 5$	$\frac{3}{5} \times 6$
5.	$\frac{1}{12} \times 7$	$\frac{5}{9} \times 7$	$\frac{7}{8} \times 3$
6.	$\frac{1}{9} \times 8$	$\frac{4}{11} \times 8$	$\frac{8}{9} \times 2$
7.	$\frac{2}{7} \times 2$	$\frac{5}{8} \times 3$	$\frac{2}{7} \times 6$
8.	$\frac{1}{13} \times 7$	$\frac{7}{11} \times 2$	$\frac{5}{9} \times 4$
9.	$\frac{2}{9} \times 4$	$\frac{6}{7} \times 3$	$\frac{7}{10} \times 9$
10.	$\frac{1}{5} \times 3$	$\frac{3}{7} \times 6$	$\frac{5}{12} \times 5$
11.	$\frac{3}{11} \times 3$	$\frac{5}{9} \times 5$	$\frac{3}{10} \times 7$
12.	$\frac{1}{8} \times 7$	$\frac{4}{9} \times 4$	$\frac{6}{7} \times 6$
13.	$6 \times \frac{4}{5}$	$12 \times \frac{4}{5}$	$\frac{1}{18} \times 5$
14.	$\frac{7}{12} \times 5$	$\frac{6}{11} \times 10$	$7 \times \frac{2}{15}$
15.	$9 \times \frac{1}{8}$	$\frac{4}{9} \times 11$	$4 \times \frac{3}{13}$
16.	$7 \times \frac{3}{8}$	$10 \times \frac{5}{7}$	$\frac{5}{13} \times 2$
17.	$\frac{5}{9} \times 8$	$12 \times \frac{4}{5}$	$\frac{9}{11} \times 8$
18.	$9 \times \frac{1}{5}$	$\frac{7}{12} \times 11$	$6 \times \frac{2}{17}$
19.	$\frac{6}{7} \times 3$	$\frac{9}{11} \times 10$	$4 \times \frac{2}{21}$
20.	$\frac{4}{11} \times 9$	$\frac{11}{12} \times 13$	$5 \times \frac{7}{24}$
21.	$8 \times \frac{3}{7}$	$\frac{19}{21} \times 10$	$\frac{7}{20} \times 7$
22.	$\frac{9}{20} \times 7$	$12 \times \frac{5}{7}$	$\frac{9}{40} \times 9$
23.	$\frac{8}{11} \times 4$	$14 \times \frac{7}{15}$	$18 \times \frac{4}{5}$
24.	$8 \times \frac{8}{9}$	$\frac{9}{10} \times 17$	$\frac{3}{25} \times 8$

LESSON 3. Introducing Cancellation

Multiply **14** by $\frac{6}{7}$.

A. $\frac{14}{1}\times\frac{6}{7}=\frac{84}{7}=12$

B. $\frac{\overset{2}{\cancel{14}}}{1}\times\frac{6}{\cancel{7}_{1}}=\frac{12}{1}=12$

In **A**
We multiplied and then divided.

In **B**
We divided and then multiplied.

To divide before multiplying saves time. It is a short-cut method of multiplying fractions.

This short-cut method is called

CANCELLATION

To *cancel* means to *divide* one numerator and one denominator by the *same* number.

In **B**

1. Divide **14** in the numerator by **7**
$\frac{\overset{2}{\cancel{14}}}{1}\times\frac{6}{7}$
2. Divide **7** in the denominator by **7**.
$\frac{\overset{2}{\cancel{14}}}{1}\times\frac{6}{\cancel{7}_{1}}$
3. Multiply the numerators $2\times6=\frac{12}{1}=12$
Multiply the denominators 1×1

Multiply **8** by $\frac{5}{6}$

$\frac{8}{1}\times\frac{5}{6}$ Divide 8 by **2** and **6** by **2**.

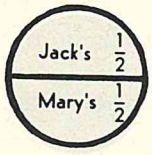
$\frac{\overset{4}{\cancel{8}}}{1}\times\frac{5}{\cancel{6}_{3}}$ Multiply numerators $4\times5=\frac{20}{3}=6\frac{2}{3}$
Multiply denominators 1×3

Cancel where you can.

1.	$16\times\frac{5}{8}$	$\frac{4}{5}\times15$	$\frac{4}{7}\times21$
2.	$24\times\frac{7}{8}$	$\frac{2}{5}\times25$	$48\times\frac{5}{6}$
3.	$15\times\frac{4}{5}$	$\frac{2}{3}\times18$	$\frac{3}{5}\times20$
4.	$35\times\frac{5}{7}$	$\frac{4}{9}\times36$	$40\times\frac{5}{8}$
5.	$21\times\frac{6}{7}$	$\frac{3}{8}\times40$	$14\times\frac{3}{7}$
6.	$36\times\frac{5}{8}$	$\frac{3}{8}\times36$	$30\times\frac{3}{50}$
7.	$\frac{7}{18}\times60$	$50\times\frac{3}{35}$	$\frac{5}{9}\times12$
8.	$25\times\frac{4}{15}$	$\frac{3}{28}\times32$	$42\times\frac{5}{8}$
9.	$\frac{3}{25}\times20$	$40\times\frac{3}{25}$	$\frac{3}{4}\times18$
10.	$30\times\frac{2}{25}$	$\frac{4}{9}\times30$	$8\times\frac{5}{12}$

LESSON 4. Multiplying a Fraction by a Fraction

Mary's mother divided a cake between Mary and her brother Jack. Mary decided to give half of hers to her friend Betty.



Mary gave $\frac{1}{2}$ of $\frac{1}{2}$ to Betty.

$\frac{1}{2}$ of $\frac{1}{2}$ means $\frac{1}{2}\times\frac{1}{2}$

Notice that for "of" we use "$\times$"

$\frac{1}{2}$ of $\frac{1}{2}=\frac{1}{4}$ Betty received $\frac{1}{4}$ of a cake.

A. Find $\frac{3}{4}$ of $\frac{8}{9}$ Cancel where you can.

$\frac{3}{4}\times\frac{8}{9}$ Divide: **3** by **3** and **9** by **3**
4 by **4** and **8** by **4**

$\frac{\cancel{3}^{1}}{\cancel{4}_{1}}\times\frac{\cancel{8}^{2}}{\cancel{9}_{3}}$ Multiply numerators $\frac{1\times2}{1\times3}=\frac{2}{3}$
Multiply denominators

B. Find $\frac{12}{25}$ of $\frac{15}{16}$

$\frac{12}{25}\times\frac{15}{16}$ Divide: **12** by **4** and **16** by **4**
25 by **5** and **15** by **5**

$\frac{\cancel{3}}{\cancel{12}_{\cancel{25}_{5}}}\times\frac{\cancel{3}}{\cancel{15}_{\cancel{16}_{4}}}$ Mul. numerators $\frac{3\times3}{5\times4}=\frac{9}{20}$
Mul. denominators

Cancel where you can.

1.	$\frac{1}{4}$ of $\frac{3}{5}$	$\frac{5}{8}\times\frac{3}{10}$	$\frac{3}{8}\times\frac{16}{21}$
2.	$\frac{1}{2}$ of $\frac{9}{10}$	$\frac{7}{9}\times\frac{2}{21}$	$\frac{7}{9}\times\frac{27}{28}$
3.	$\frac{1}{3}$ of $\frac{1}{2}$	$\frac{5}{6}\times\frac{7}{15}$	$\frac{2}{3}\times\frac{9}{10}$
4.	$\frac{1}{4}$ of $\frac{1}{2}$	$\frac{4}{9}\times\frac{18}{19}$	$\frac{3}{10}\times\frac{5}{6}$
5.	$\frac{1}{6}$ of $\frac{1}{2}$	$\frac{3}{7}\times\frac{21}{25}$	$\frac{5}{8}\times\frac{4}{15}$
6.	$\frac{1}{3}$ of $\frac{5}{6}$	$\frac{6}{11}\times\frac{2}{3}$	$\frac{8}{9}\times\frac{3}{4}$
7.	$\frac{1}{8}$ of $\frac{2}{3}$	$\frac{12}{13}\times\frac{5}{6}$	$\frac{3}{4}\times\frac{2}{9}$
8.	$\frac{2}{9}$ of $\frac{1}{3}$	$\frac{4}{21}\times\frac{7}{9}$	$\frac{5}{7}\times\frac{14}{15}$
9.	$\frac{3}{5}$ of $\frac{2}{7}$	$\frac{3}{10}\times\frac{5}{7}$	$\frac{5}{9}\times\frac{27}{35}$
10.	$\frac{3}{8}$ of $\frac{1}{9}$	$\frac{9}{13}\times\frac{5}{27}$	$\frac{3}{7}\times\frac{35}{36}$
11.	$\frac{5}{6}$ of $\frac{1}{15}$	$\frac{8}{11}\times\frac{3}{4}$	$\frac{3}{10}\times\frac{5}{6}$
12.	$\frac{7}{9}$ of $\frac{1}{3}$	$\frac{16}{19}\times\frac{3}{8}$	$\frac{4}{9}\times\frac{27}{32}$

Cancel where you can.

1.	$\frac{7}{8}\times\frac{6}{21}$	$\frac{3}{10}\times\frac{25}{27}$	$\frac{45}{52}\times\frac{4}{9}$
2.	$\frac{8}{9}\times\frac{9}{20}$	$\frac{9}{14}\times\frac{7}{15}$	$\frac{40}{63}\times\frac{7}{12}$
3.	$\frac{2}{9}\times\frac{21}{26}$	$\frac{5}{9}\times\frac{12}{35}$	$\frac{13}{15}\times\frac{20}{39}$
4.	$\frac{4}{9}\times\frac{15}{16}$	$\frac{5}{16}\times\frac{12}{25}$	$\frac{17}{18}\times\frac{24}{51}$
5.	$\frac{5}{12}\times\frac{8}{15}$	$\frac{8}{9}\times\frac{27}{32}$	$\frac{2}{9}\times\frac{3}{4}$
6.	$\frac{9}{16}\times\frac{4}{27}$	$\frac{7}{8}\times\frac{16}{35}$	$\frac{4}{5}\times\frac{25}{36}$
7.	$\frac{7}{12}\times\frac{9}{28}$	$\frac{5}{12}\times\frac{8}{15}$	$\frac{7}{8}\times\frac{16}{35}$
8.	$\frac{5}{6}\times\frac{9}{20}$	$\frac{9}{20}\times\frac{10}{27}$	$\frac{5}{17}\times\frac{34}{35}$
9.	$\frac{4}{7}\times\frac{21}{35}$	$\frac{4}{9}\times\frac{27}{32}$	$\frac{56}{63}\times\frac{9}{14}$
10.	$\frac{5}{9}\times\frac{21}{25}$	$\frac{6}{7}\times\frac{21}{48}$	$\frac{39}{45}\times\frac{5}{13}$
11.	$\frac{2}{9}\times\frac{15}{16}$	$\frac{21}{32}\times\frac{16}{35}$	$\frac{26}{33}\times\frac{11}{13}$
12.	$\frac{8}{11}\times\frac{33}{40}$	$\frac{7}{11}\times\frac{22}{49}$	$\frac{29}{39}\times\frac{13}{14}$

LESSON 5. Multiplying When Mixed Numbers Are Involved

Study the following examples:

A. If a train travels at the speed of 50 m.p.h., how far will it go in 6 hours?

D = m.p.h. × no. of hr.

? = 50 × 6

= 300 miles

B. If a plane averages 300 m.p.h., how far will it go in $3\frac{1}{4}$ hours?

D = m.p.h. × no. of hr.

$? = 300 \times 3\frac{1}{4}$

$= \frac{\overset{75}{\cancel{300}}}{1} \times \frac{13}{\cancel{4}_{1}} = \frac{975}{1}$

= 975 miles

C. If Bill can ride $3\frac{1}{3}$ miles on his bicycle in 1 hour, how far will he ride in $2\frac{1}{4}$ hours?

D = m.p.h. × no. of hr.

$? = 3\frac{1}{3} \times 2\frac{1}{4}$

$= \frac{\overset{5}{\cancel{10}}}{\underset{1}{\cancel{3}}} \times \frac{\overset{3}{\cancel{9}}}{\underset{2}{\cancel{4}}} = \frac{15}{2}$

$= 7\frac{1}{2}$ miles

Change mixed numbers to improper fractions before multiplying.

Multiply, using cancellation where possible:

1. 16 by $3\frac{1}{4}$	$1\frac{2}{5}$ by 15	$5\frac{1}{4} \times 3\frac{1}{5}$
2. 18 by $1\frac{2}{9}$	$2\frac{1}{4}$ by 12	$2\frac{1}{3} \times 2\frac{1}{4}$
3. 24 by $2\frac{3}{8}$	$8\frac{1}{2}$ by 10	$1\frac{1}{9} \times 3\frac{3}{5}$
4. 10 by $1\frac{4}{5}$	$2\frac{1}{9}$ by 27	$4\frac{1}{5} \times 1\frac{3}{7}$
5. 25 by $2\frac{1}{10}$	$4\frac{1}{3}$ by 9	$2\frac{5}{8} \times 5\frac{1}{3}$
6. 12 by $4\frac{1}{3}$	$8\frac{1}{4}$ by 6	$2\frac{6}{7} \times 5\frac{1}{4}$
7. 32 by $1\frac{1}{8}$	$3\frac{1}{6}$ by 4	$3\frac{3}{4} \times 1\frac{3}{5}$
8. 15 by $2\frac{1}{3}$	$2\frac{2}{9}$ by 6	$3\frac{2}{3} \times 2\frac{1}{7}$
9. 14 by $1\frac{1}{7}$	$4\frac{1}{8}$ by 12	$4\frac{1}{6} \times 3\frac{3}{5}$
10. 20 by $2\frac{1}{10}$	$3\frac{1}{3}$ by 15	$6\frac{2}{5} \times 3\frac{1}{8}$
11. 27 by $1\frac{1}{9}$	$2\frac{1}{6}$ by 9	$1\frac{1}{7} \times 2\frac{5}{8}$
12. 36 by $2\frac{1}{9}$	$1\frac{1}{4}$ by 16	$6\frac{3}{8} \times 1\frac{1}{9}$

Multiply:

1. $3\frac{3}{4} \times \frac{2}{3}$	$6\frac{1}{4} \times \frac{3}{5}$	$\frac{5}{9} \times 3\frac{3}{5}$
2. $1\frac{1}{9} \times \frac{3}{4}$	$\frac{6}{7} \times 1\frac{1}{6}$	$6\frac{2}{5} \times \frac{5}{8}$
3. $3\frac{3}{8} \times 5\frac{1}{3}$	$5\frac{1}{4} \times \frac{4}{21}$	$3\frac{1}{9} \times \frac{9}{14}$
4. $5\frac{1}{3} \times \frac{9}{20}$	$\frac{4}{5} \times 3\frac{1}{8}$	$\frac{7}{8} \times 1\frac{5}{7}$
5. $2\frac{1}{4} \times \frac{4}{9}$	$\frac{5}{9} \times 2\frac{4}{7}$	$9\frac{1}{3} \times \frac{9}{14}$

Solve:

1. Bob worked after school and earned $\$4\frac{1}{2}$. He spent $\frac{2}{3}$ of it for a new sweater. How much did he spend?
2. Jack had 60¢. He gave $\frac{3}{5}$ of it to the missions. How many cents did he give to the missions?
3. Ellen's mother is $5\frac{1}{3}$ feet tall. Ellen's height is $\frac{3}{4}$ of her mother's. How tall is Ellen?
4. Mrs. Kirk bought $2\frac{1}{4}$ pounds of meat. She used $\frac{2}{3}$ of it for dinner. How many pounds did she use?
5. Find $\frac{7}{8}$ of 12.

When a whole number is multiplied by a proper fraction the product is less than the original number:

$6 \times \frac{1}{2} = 3$

When a whole number is multiplied by a mixed number, the product is more than the original number:

$6 \times 1\frac{1}{2} = 9$

Problems in Multiplication of Fractions

1. In our room there are 48 pupils. If $\frac{3}{4}$ of them are ten years old, how many pupils are not ten years old?

2. Rosemary has a book of 180 pages. She has read $\frac{5}{6}$ of these pages. How many pages has she read?

3. Joseph's mother bought 8 packages of tea each containing $\frac{3}{4}$ of a pound. How much tea did she buy?

4. How long will it take a boy to row his boat 6 miles if it takes $\frac{1}{2}$ hour to row one mile?

5. A fur coat marked $325 was sold for $\frac{4}{5}$ of that price. For how much was it sold?

6. There are 8 persons in our family. If mother allows $\frac{3}{8}$ of a pound of bacon for each one's breakfast, how much does it cost at 45 cents a pound?

7. If Raymond's watch loses $3\frac{1}{5}$ seconds a day, how many seconds will it lose in 15 days?

8. If the multiplier is $3\frac{1}{9}$ and the multiplicand is $4\frac{1}{2}$, what is the product?

9. Mother bought $5\frac{1}{3}$ yards of muslin. She used $\frac{3}{4}$ of it. How much did she use?

10. Mr. Hill has 184 trees in his orchard. If $\frac{3}{8}$ of them are peach trees, how many are not peach trees?

11. Mrs. Todd sold 8 chickens each weighing $5\frac{1}{4}$ pounds. What was their total weight?

12. Mr. Davis bought $\frac{7}{12}$ of a gross of copy books at 5¢ each. What did they cost?

13. Larry lives $\frac{3}{4}$ of a mile from school. If he walks to and from school each day, how far does he walk in 5 days?

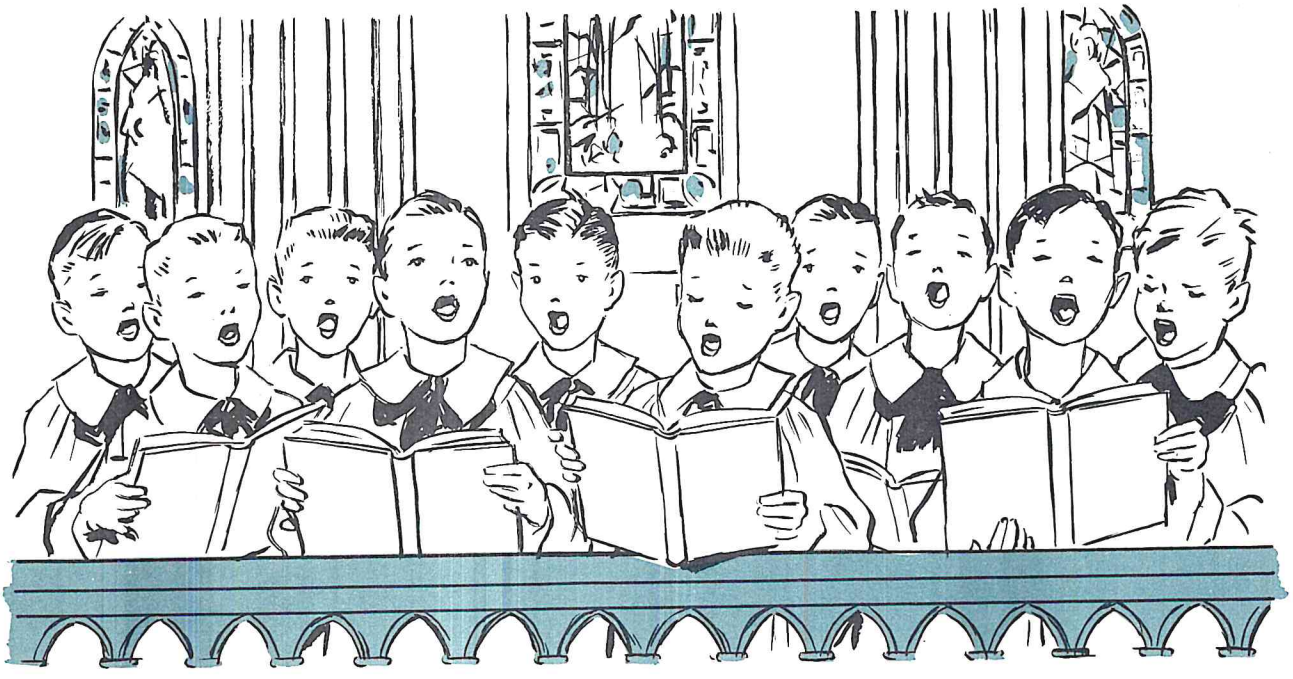
14. Tom is $4\frac{1}{8}$ feet tall. His mother is $1\frac{1}{3}$ times as tall. How tall is his mother?

15. Harry can read 210 words a minute. Billy can read $1\frac{1}{3}$ times as fast. How many words a minute can Billy read?

16. Dan packed 56 boxes of candy. Each box weighed $\frac{3}{8}$ of a pound. How many pounds did he pack in all?

17. John had $\frac{7}{8}$ of a yard of braid. He used $\frac{1}{2}$ of it to trim his band uniform. How much braid did he use?

18. Mother had $\frac{2}{3}$ of a pound of sugar. She used $\frac{1}{4}$ of it to make a cake. How much sugar did she use?



Practice With Problems

1. In our school choir we have about 60 choir boys. If $\frac{5}{6}$ of them have not missed a rehearsal this year, how many have perfect attendance?

2. Last week the members of our choir practiced $\frac{3}{4}$ of an hour every day for 5 days. How many hours was that?

3. Each boy in the choir paid $\$8\frac{1}{2}$ for his cassock, $\$3\frac{1}{4}$ for his surplice and $\$\frac{3}{4}$ for his tie. How much did each boy pay?

4. If the choir sang for $\frac{1}{2}$ hr. on Monday, $\frac{1}{3}$ hr. on Tuesday, $\frac{3}{4}$ hr. on Wednesday, and $\frac{5}{6}$ hr. on Thursday, how many hours was that altogether?

5. The men practice $3\frac{3}{4}$ hr. each week, but the boys practice $5\frac{1}{2}$ hrs. How much longer do the boys practice?

6. The choir boys traveled in the school bus $2\frac{3}{4}$ hours to sing in another town. If they stayed there 2 hours and then spent $2\frac{3}{4}$ hr. returning home, how long were they away from home?

7. The ages of our choir boys are 10, 11, and 12 years. If there are 55 in all and $\frac{2}{5}$ are 10 yr. old, $\frac{5}{11}$ are 11 years old, how many are 12 years old?

8. Sister must buy ribbon for the choir boys' ties. If each tie is $\frac{7}{8}$ yd. long, how many yards does Sister need for 56 choir boys?

9. The altar boys bought three turkeys for the orphans' Christmas dinner. They weighed $18\frac{3}{4}$ lb., $13\frac{3}{4}$ lb., and $16\frac{1}{2}$ lb. How many pounds of turkey did they purchase?

10. The boys practiced hymns for $14\frac{2}{3}$ hours altogether for the Christmas Mass, and $22\frac{5}{8}$ hours for the Easter Mass. How much longer did they practice for Easter than for Christmas?

LESSON 6. Another Way of Multiplying Fractions

A. Multiply 8 by $3\frac{1}{4}$

$\frac{\overset{2}{\cancel{8}}}{1} \times \frac{13}{\underset{1}{\cancel{4}}} = \frac{26}{1} = 26$

Another way of doing this example is:

$3\frac{1}{4}$ $\quad \frac{1}{\cancel{4}} \times \frac{\overset{2}{\cancel{8}}}{1} = \frac{2}{1} = 2$

8

2

24

26

Result 26

B. At \$1.72 a yard find the cost of $18\frac{3}{4}$ yards.

\$1.72 = Cost of 1 yd.

$18\frac{3}{4}$ $\quad \frac{3}{\cancel{4}} \times \frac{\overset{43}{\cancel{172}}}{1} = 129$

1 29

13 76

17 2

\$32.25 = C. of $18\frac{3}{4}$ yd.

Result \$32.25

C. At $43\frac{5}{6}$ m.p.h. how far will a train go in 14 hours?

$43\frac{5}{6}$ $\quad \frac{5}{\cancel{6}} \times \frac{\overset{7}{\cancel{14}}}{1} = \frac{35}{3} = 11\frac{2}{3}$

14

$11\frac{2}{3}$

172

43

$613\frac{2}{3}$ = no. mi. in 14 hr.

Result $613\frac{2}{3}$ mi.

Note the placement of the partial products.

Multiply:

1.	\$1.32 × $18\frac{1}{6}$	\$1.62 × $20\frac{1}{2}$	
2.	\$4.50 × $14\frac{2}{5}$	\$4.15 × $30\frac{2}{5}$	
3.	\$2.40 × $12\frac{1}{4}$	\$8.16 × $40\frac{3}{8}$	
4.	\$9.20 × $10\frac{1}{5}$	\$6.24 × $50\frac{5}{6}$	
5.	\$6.38 × $13\frac{3}{4}$	\$2.32 × $60\frac{5}{8}$	
6.	\$2.04 × $16\frac{2}{3}$	\$5.25 × $90\frac{3}{5}$	
7.	\$7.18 × $17\frac{1}{5}$	\$8.40 × $70\frac{3}{4}$	
8.	\$8.37 × $18\frac{2}{9}$	\$2.79 × $80\frac{5}{9}$	
9.	\$3.18 × $10\frac{5}{6}$	\$9.20 × $90\frac{1}{4}$	
10.	\$4.34 × $12\frac{2}{7}$	\$6.24 × $70\frac{2}{3}$	
11.	$\frac{4}{15} \times 7$	$\frac{1}{4}$ of $5\frac{1}{3}$	$3\frac{1}{3} \times 3\frac{3}{5}$
12.	$\frac{3}{4} \times 5$	$\frac{3}{5}$ of $3\frac{1}{3}$	$2\frac{4}{9} \times 1\frac{10}{11}$
13.	$8 \times \frac{3}{7}$	$\frac{7}{8}$ of $2\frac{2}{5}$	$4\frac{1}{5} \times 6\frac{2}{3}$
14.	$\frac{3}{8} \times \frac{1}{9}$	$\frac{3}{10}$ of $6\frac{2}{3}$	$7\frac{1}{2} \times 4\frac{2}{5}$
15.	$\frac{5}{6} \times 18$	$\frac{3}{20}$ of $4\frac{4}{9}$	$8\frac{3}{4} \times 1\frac{1}{7}$
16.	$\frac{4}{9} \times 27$	$\frac{5}{12}$ of $1\frac{9}{15}$	$3\frac{4}{7} \times 3\frac{4}{15}$
17.	$16 \times \frac{5}{6}$	$\frac{7}{9}$ of $2\frac{4}{7}$	$6\frac{2}{9} \times 3\frac{6}{7}$
18.	$21 \times \frac{6}{7}$	$\frac{2}{3}$ of $5\frac{1}{4}$	$4\frac{7}{8} \times 2\frac{6}{13}$
19.	$\frac{5}{16} \times \frac{8}{15}$	$\frac{7}{12}$ of 72	$9\frac{1}{6} \times 4\frac{4}{11}$
20.	$\frac{4}{9} \times \frac{6}{9}$	$\frac{9}{11}$ of $4\frac{2}{5}$	$8\frac{4}{7} \times 2\frac{1}{10}$

Solve:

1. Mrs. Collins purchased $16\frac{3}{4}$ yd. of velvet at \$4.80 a yd. How much did she pay for it?

2. If Jack can swim $14\frac{2}{7}$ yd. in one minute, how far can he swim in $4\frac{1}{5}$ minutes?

Problems to Solve

1. A chicken that weighed $4\frac{1}{2}$ lb. lost $\frac{1}{9}$ of its weight in cooking. What part of a pound did it lose?

2. A lunch roll weighing $3\frac{3}{4}$ lb. is sliced by machine. If the slicing machine cuts 24 slices to the pound, how many slices can be obtained from the roll?

3. How much must be added to $3\frac{4}{9}$ to make 5?

4. Mr. Power owned $10\frac{1}{5}$ acres of ground. He sold $4\frac{5}{6}$ acres. How many had he left?

5. Jim bought $\frac{3}{4}$ of a pound of nut candy and $\frac{3}{8}$ of a pound of hard candy. How much candy did Jim buy?

6. Patricia rode $3\frac{7}{8}$ miles on her bicycle on Monday, $4\frac{3}{4}$ miles on Tuesday, and $2\frac{5}{6}$ miles on Wednesday. How far did she ride on the three days?

7. Mrs. Martin bought $2\frac{2}{5}$ bushels of potatoes. She used $\frac{5}{6}$ of them. How many bushels did she use?

8. Regina's recipe for fudge calls for $2\frac{3}{4}$ cupfuls of sugar. If she has only $1\frac{5}{6}$ cupfuls, how much more sugar does she need?

9. From a roast of beef weighing $4\frac{1}{2}$ pounds, $2\frac{3}{4}$ pounds have been used. How many pounds still remain?

10. Tom's father had a farm of $10\frac{1}{8}$ acres. He sold $\frac{1}{9}$ of it. How much did he sell?

11. One airplane can go 340 miles an hour. Another plane can go only $\frac{3}{4}$ as fast. How many miles can the second plane go?

12. Jack is $54\frac{3}{4}$ inches tall. Bill is $52\frac{1}{6}$ inches tall. How much taller is Jack than Bill?

13. One month Mother used $5\frac{5}{8}$ pounds of butter. The next month she used $1\frac{1}{3}$ times as much. How much did she use the second month?

14. There are 60 minutes in one hour. How many minutes are there in $\frac{5}{6}$ of an hour?

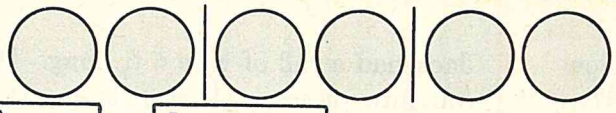
15. A plane required $5\frac{3}{4}$ minutes to take off, but $8\frac{1}{2}$ minutes to land. How much longer did it take to land?

16. One train takes $1\frac{9}{10}$ hours to travel from New York to Philadelphia. Another train can make the trip in $\frac{5}{6}$ of the time. How long does it take the second train?

17. There are 720 pupils in one school. Another school has $\frac{7}{8}$ as many. How many pupils has the second school?

18. The distance from one city to New York is $9\frac{5}{8}$ miles. Another is only $5\frac{3}{4}$ miles from New York. How much closer is the second city to New York than the first?

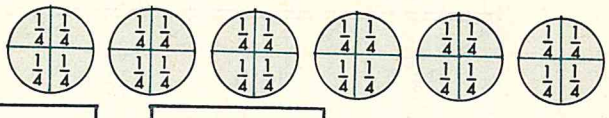
How many **2's** are there in **6**? I find the answer by dividing **6** into **2's**.



The diagram shows that
In **6**, there are three **2's**.

A. $2\overline{)6}$ **3** or **B.** $6 \div 2 = 3$ The divisor is **2**, the dividend is **6**, the quotient is **3**.

How many $\frac{1}{4}$'s are there in **6**? I find the answer by dividing **6** into $\frac{1}{4}$'s.



The diagram shows that
In **6**, there are twenty-four $\frac{1}{4}$'s.

A. $\frac{1}{4}\overline{)6}$ or **B.** $6 \div \frac{1}{4} = 24$ The divisor is $\frac{1}{4}$, the dividend is **6**, the quotient is **24**.

In division of *fractions*, the form $6 \div \frac{1}{4}$ is used.

LESSON 7. Dividing a Whole Number by a Fraction

To divide a whole number such as **6** by a fraction such as $\frac{1}{4}$ we must use the following method:

1. Write the denominator **1** under the whole number.
2. Change the sign $\div$ to $\times$
3. Invert the divisor (invert means to turn upside down).
4. Multiply numerator by numerator.
5. Multiply denominator by denominator.
6. Write the whole number without the denominator **1**.

Arrange your example this way: $6 \div \frac{1}{4} = \frac{6}{1} \div \frac{1}{4}$

$= \frac{6}{1} \times \frac{4}{1} = \frac{24}{1} = 24$

$6 \div \frac{1}{4}$

$\frac{6}{1} \div \frac{1}{4}$ Step **1**

$\frac{6}{1} \times \frac{4}{1}$ Steps **2** and **3**

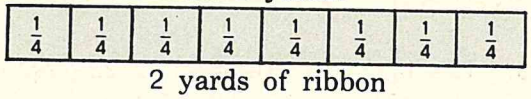
$\frac{24}{1}$ Steps **4** and **5**

24 Step **6**

Divide:

1.	$7 \div \frac{1}{3}$	$8 \div \frac{1}{2}$	$16 \div \frac{1}{3}$
2.	$6 \div \frac{1}{2}$	$5 \div \frac{1}{6}$	$18 \div \frac{1}{7}$
3.	$8 \div \frac{1}{5}$	$7 \div \frac{1}{9}$	$15 \div \frac{1}{6}$
4.	$3 \div \frac{1}{6}$	$12 \div \frac{1}{4}$	$17 \div \frac{1}{8}$
5.	$4 \div \frac{1}{5}$	$10 \div \frac{1}{9}$	$19 \div \frac{1}{2}$
6.	$9 \div \frac{1}{4}$	$11 \div \frac{1}{5}$	$13 \div \frac{1}{7}$

1. How many pieces of ribbon $\frac{1}{4}$ yd. long, can be cut from 2 yards?



2 yards of ribbon

2. How many pieces of wire $\frac{1}{2}$ yd. long can be cut from 8 yards?

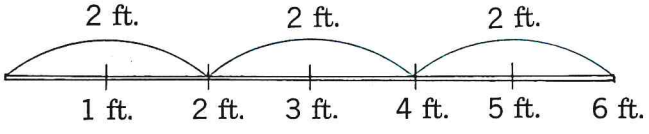
3. Mrs. Hill has 10 pounds of candy. If she packs it into $\frac{1}{2}$ pound boxes, how many boxes can she fill?

4. At the party, Nan's mother cut up 6 large cakes into $\frac{1}{4}$'s. How many pieces were there?

LESSON 8. Dividing a Whole Number by a Mixed Number

Bill had a roll of wire **6** ft. long. Into how many pieces **2** ft. long can he cut this roll?

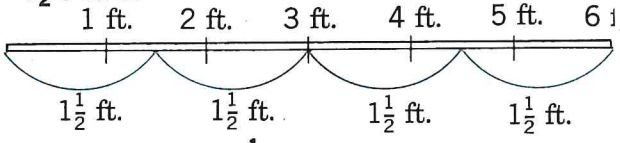
Bill will have as many pieces as there are **2's** in **6.**



Each piece = **2** ft. long.
Bill had **3** pieces each **2** ft. long.

Jack had a roll of wire **6** ft. long. He cut his roll into pieces $1\frac{1}{2}$ feet long. How many pieces had he?

Jack will have as many pieces as there are $1\frac{1}{2}$'s in **6.**



Each piece = $1\frac{1}{2}$ ft. long.

$$6 \div 1\frac{1}{2} = 6 \div \frac{3}{2}$$

$$= \frac{\overset{2}{\cancel{6}}}{1} \times \frac{2}{\cancel{3}_{1}} = 4$$

Jack had **4** pieces each $1\frac{1}{2}$ ft. long.

In division of fractions:

1. Change the sign "÷" to "×".
2. Invert the divisor.
3. Cancel where possible.
4. Multiply numerators.
5. Multiply denominators.
6. If the quotient is an improper fraction, change it to a mixed number.

When the divisor is a mixed number, change it to an improper fraction before dividing.

Cancel where you can:

1.	$10 \div 3\frac{1}{3}$	$30 \div 6\frac{1}{4}$	$35 \div 2\frac{1}{7}$
2.	$18 \div 2\frac{1}{4}$	$52 \div 2\frac{8}{9}$	$24 \div 3\frac{3}{4}$
3.	$20 \div 1\frac{1}{4}$	$33 \div 5\frac{1}{2}$	$27 \div 3\frac{3}{5}$
4.	$15 \div 1\frac{2}{3}$	$75 \div 3\frac{3}{4}$	$30 \div 2\frac{2}{5}$
5.	$16 \div 1\frac{1}{3}$	$8 \div 5\frac{1}{3}$	$22 \div 2\frac{2}{3}$
6.	$26 \div 2\frac{1}{6}$	$39 \div 2\frac{1}{2}$	$18 \div 7\frac{1}{2}$
7.	$36 \div 4\frac{1}{2}$	$51 \div 3\frac{2}{5}$	$27 \div 3\frac{3}{7}$
8.	$46 \div 3\frac{5}{6}$	$48 \div 3\frac{1}{5}$	$40 \div 6\frac{1}{4}$
9.	$50 \div 3\frac{1}{8}$	$45 \div 3\frac{3}{4}$	$28 \div 5\frac{1}{3}$
10.	$63 \div 2\frac{5}{8}$	$42 \div 4\frac{1}{5}$	$25 \div 1\frac{1}{9}$

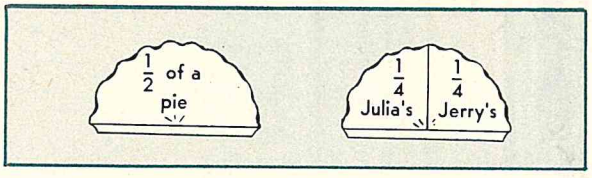
If you have difficulty in deciding the proces in solving the following problems, substitut a whole number for the mixed number, an then decide.

1. If Larry can travel 8 miles on his bicycle in $1\frac{1}{3}$ hours, how far can he travel in 1 hour?
2. If a plane can go 25 miles in $4\frac{1}{6}$ minutes how far will it go in 1 minute?
3. If Tom can earn $20 in $2\frac{1}{2}$ weeks, how much can he earn in 1 week?
4. Mary's mother paid $9 for $2\frac{1}{4}$ yards of silk. How much a yard was this?
5. A train goes 180 miles in $4\frac{1}{2}$ hours. How far will it go in 1 hour?
6. John can make a purse in $1\frac{1}{4}$ hours. How many can he make in 10 hours?

LESSON 9. Dividing a Fraction by a Whole Number and by a Fraction

In the pantry there is $\frac{1}{2}$ of a pie to be divided between Julia and Jerry.

What part of a pie will each receive?



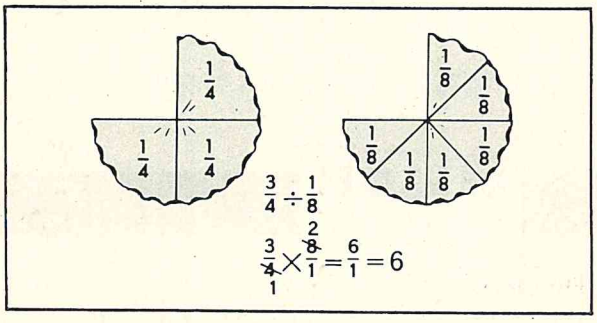
To divide $\frac{1}{2}$ of a pie between Julia and Jerry is to divide $\frac{1}{2}$ by **2**.

$$\frac{1}{2} \div \frac{2}{1}$$
$$= \frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$$

Each one will receive $\frac{1}{4}$ of a pie.

Mother has $\frac{3}{4}$ of a custard pie. How many people can she serve if each person receives $\frac{1}{8}$ of a pie?

To find what part each person will receive, see how many $\frac{1}{8}$'s there are in $\frac{3}{4}$.



Mother can serve 6 people.

Divide:

1.	$\frac{1}{5} \div 3$	$\frac{4}{5} \div 8$	$\frac{4}{7} \div 9$
2.	$\frac{2}{3} \div 6$	$\frac{1}{3} \div 2$	$\frac{1}{6} \div 7$
3.	$\frac{3}{5} \div 9$	$\frac{5}{6} \div 5$	$\frac{1}{5} \div 4$
4.	$\frac{7}{10} \div 2$	$\frac{7}{8} \div 14$	$\frac{6}{7} \div 12$
5.	$\frac{5}{8} \div 5$	$\frac{8}{9} \div 16$	$\frac{5}{7} \div 15$
6.	$\frac{6}{7} \div 3$	$\frac{4}{5} \div 12$	$\frac{8}{9} \div 32$
7.	$\frac{5}{6} \div 15$	$\frac{6}{7} \div 24$	$\frac{5}{9} \div 35$
8.	$\frac{5}{9} \div 10$	$\frac{3}{5} \div 6$	$\frac{1}{4} \div 3$
9.	$\frac{3}{4} \div 6$	$\frac{3}{4} \div 12$	$\frac{7}{8} \div 21$
10.	$\frac{5}{7} \div 10$	$\frac{3}{5} \div 10$	$\frac{3}{7} \div 9$
11.	$\frac{4}{9} \div 7$	$\frac{9}{10} \div 8$	$\frac{3}{8} \div 6$
12.	$\frac{2}{5} \div 11$	$\frac{7}{9} \div 9$	$\frac{7}{9} \div 7$

Divide:

1.	$\frac{3}{5} \div \frac{4}{15}$	$\frac{5}{18} \div \frac{2}{9}$	$\frac{5}{24} \div \frac{7}{16}$
2.	$\frac{7}{8} \div \frac{3}{4}$	$\frac{8}{9} \div \frac{4}{5}$	$\frac{8}{15} \div \frac{4}{25}$
3.	$\frac{3}{4} \div \frac{9}{10}$	$\frac{2}{5} \div \frac{1}{3}$	$\frac{7}{12} \div \frac{5}{9}$
4.	$\frac{9}{11} \div \frac{3}{4}$	$\frac{4}{9} \div \frac{8}{9}$	$\frac{15}{16} \div \frac{3}{8}$
5.	$\frac{3}{8} \div \frac{3}{4}$	$\frac{3}{7} \div \frac{3}{7}$	$\frac{7}{18} \div \frac{14}{15}$
6.	$\frac{3}{10} \div \frac{4}{5}$	$\frac{5}{8} \div \frac{5}{8}$	$\frac{13}{14} \div \frac{39}{49}$
7.	$\frac{6}{7} \div \frac{3}{14}$	$\frac{3}{7} \div \frac{6}{7}$	$\frac{12}{35} \div \frac{9}{28}$
8.	$\frac{10}{11} \div \frac{15}{16}$	$\frac{4}{5} \div \frac{4}{5}$	$\frac{17}{33} \div \frac{5}{11}$
9.	$\frac{6}{7} \div \frac{3}{7}$	$\frac{3}{7} \div \frac{6}{7}$	$\frac{7}{15} \div \frac{14}{33}$
10.	$\frac{5}{9} \div \frac{2}{3}$	$\frac{8}{9} \div \frac{4}{5}$	$\frac{7}{17} \div \frac{7}{34}$
11.	$\frac{9}{11} \div \frac{3}{4}$	$\frac{3}{8} \div \frac{6}{7}$	$\frac{9}{32} \div \frac{5}{16}$
12.	$\frac{7}{9} \div \frac{14}{15}$	$\frac{4}{7} \div \frac{4}{7}$	$\frac{14}{15} \div \frac{7}{15}$

Jane used $7\frac{1}{2}$ yards of material to make 3 aprons. How many yards did she use for each?

We can find the answer by dividing $7\frac{1}{2}$ by 3.

$$7\tfrac{1}{2} \div 3 = \tfrac{15}{2} \div \tfrac{3}{1}$$

$$= \tfrac{\cancel{15}^{5}}{2} \times \tfrac{1}{\cancel{3}_{1}} = \tfrac{5}{2} \text{ or } 2\tfrac{1}{2} \text{ yd.}$$

Jane used $2\frac{1}{2}$ yards for each apron.

Sister has $2\frac{1}{2}$ dozen roses. If she puts $\frac{1}{2}$ dozen in each vase, how many vases will she need?

We can find the answer by dividing $2\frac{1}{2}$ by $\frac{1}{2}$.

$$2\tfrac{1}{2} \div \tfrac{1}{2}$$

$$= \tfrac{5}{2} \div \tfrac{1}{2}$$

$$= \tfrac{5}{\cancel{2}_{1}} \times \tfrac{\cancel{2}^{1}}{1} = \tfrac{5}{1} = 5$$

Sister will need 5 vases.

LESSON 10. More Fractions in Division

Divide:

1.	$1\frac{1}{5} \div 6$	$8\frac{1}{3} \div 15$	$8\frac{1}{10} \div 36$
2.	$6\frac{1}{4} \div 10$	$4\frac{1}{5} \div 14$	$5\frac{1}{3} \div 24$
3.	$2\frac{1}{7} \div 5$	$4\frac{1}{6} \div 20$	$1\frac{7}{8} \div 25$
4.	$2\frac{1}{3} \div 2$	$5\frac{1}{7} \div 27$	$3\frac{3}{8} \div 18$
5.	$3\frac{3}{5} \div 9$	$6\frac{1}{8} \div 28$	$6\frac{1}{4} \div 35$
6.	$9\frac{1}{6} \div 10$	$3\frac{6}{7} \div 18$	$4\frac{3}{8} \div 14$
7.	$6\frac{1}{2} \div 2$	$5\frac{4}{9} \div 14$	$4\frac{2}{3} \div 35$
8.	$4\frac{1}{2} \div 3$	$2\frac{4}{7} \div 27$	$5\frac{5}{8} \div 18$
9.	$3\frac{1}{5} \div 8$	$9\frac{1}{3} \div 21$	$3\frac{1}{8} \div 30$
10.	$4\frac{3}{8} \div 5$	$8\frac{1}{3} \div 15$	$6\frac{2}{9} \div 16$

Divide:

1.	$2\frac{1}{4} \div \frac{9}{10}$	$2\frac{3}{4} \div \frac{5}{12}$	$1\frac{1}{8} \div \frac{1}{8}$
2.	$6\frac{1}{8} \div \frac{7}{16}$	$4\frac{1}{6} \div \frac{15}{16}$	$6\frac{3}{4} \div \frac{9}{10}$
3.	$5\frac{1}{4} \div \frac{3}{8}$	$3\frac{1}{5} \div \frac{4}{15}$	$5\frac{4}{7} \div \frac{13}{28}$
4.	$2\frac{1}{2} \div \frac{5}{8}$	$7\frac{1}{7} \div \frac{5}{8}$	$2\frac{1}{16} \div \frac{11}{24}$
5.	$8\frac{1}{6} \div \frac{7}{9}$	$8\frac{1}{6} \div \frac{7}{12}$	$3\frac{3}{10} \div \frac{18}{25}$
6.	$4\frac{1}{5} \div \frac{3}{7}$	$8\frac{1}{3} \div \frac{10}{11}$	$4\frac{4}{9} \div \frac{50}{63}$
7.	$5\frac{1}{3} \div \frac{8}{15}$	$2\frac{1}{4} \div \frac{3}{4}$	$9\frac{1}{7} \div \frac{32}{35}$
8.	$3\frac{1}{8} \div \frac{5}{12}$	$2\frac{2}{3} \div \frac{3}{8}$	$5\frac{4}{9} \div \frac{14}{27}$
9.	$3\frac{1}{5} \div \frac{4}{15}$	$5\frac{1}{4} \div \frac{7}{8}$	$3\frac{3}{11} \div \frac{9}{22}$
10.	$6\frac{1}{4} \div \frac{5}{8}$	$5\frac{5}{8} \div \frac{5}{8}$	$4\frac{1}{6} \div \frac{35}{36}$

Solve:

1. If 14 children share equally $9\frac{1}{3}$ lb. of candy, what part of a pound will each receive?
2. If it takes Bill $5\frac{1}{4}$ minutes to solve 7 problems in arithmetic, how much time can he allow for each problem?
3. Ann had $2\frac{1}{2}$ yd. of lace which she cut into pieces $\frac{1}{2}$ yd. long. How many pieces had she?
4. Matthew has saved $\$5\frac{1}{4}$ for Christmas presents. If he intends to spend $\$\frac{3}{4}$ on each present, how many can he buy?

More Fractions in Division

Study the following examples:

1. Mrs. Baker used **4** tons of coal in **8** weeks. How much did she use each week?

   To find the answer, divide **4** by **8**.

   $\frac{4}{1} \div \frac{8}{1} = \frac{\overset{1}{\cancel{4}}}{1} \times \frac{1}{\underset{2}{\cancel{8}}} = \frac{1}{2}$ of a ton

   Mrs. Baker used $\frac{1}{2}$ of a ton.

2. Mrs. Jones used $4\frac{1}{2}$ tons of coal in $5\frac{1}{7}$ weeks. How much did she use each week?

   To find the answer, divide $4\frac{1}{2}$ by $5\frac{1}{7}$.

   $4\frac{1}{2} \div 5\frac{1}{7} = \frac{9}{2} \div \frac{36}{7}$

   $= \frac{\overset{1}{\cancel{9}}}{2} \times \frac{7}{\underset{4}{\cancel{36}}} = \frac{7}{8}$ of a ton

   Mrs. Jones used $\frac{7}{8}$ of a ton.

3. If Mr. Benson drives his car **10** miles in **15** minutes, how far does he go in **1** minute?

   To find the answer, divide **10** by **15**.

   $\frac{10}{1} \div \frac{15}{1} = \frac{\overset{2}{\cancel{10}}}{1} \times \frac{1}{\underset{3}{\cancel{15}}} = \frac{2}{3}$ of a mile.

   Mr. Benson drives $\frac{2}{3}$ of a mile in a minute.

4. If Tom can row his boat $\frac{3}{5}$ of a mile in $3\frac{3}{5}$ minutes, how far does he go in **1** minute?

   To find the answer, divide $\frac{3}{5}$ by $3\frac{3}{5}$.

   $\frac{3}{5} \div 3\frac{3}{5} = \frac{3}{5} \div \frac{18}{5}$

   $= \frac{\overset{1}{\cancel{3}}}{\underset{1}{5}} \times \frac{\overset{1}{5}}{\underset{6}{\cancel{18}}} = \frac{1}{6}$ of a mile

   Tom rows $\frac{1}{6}$ of a mile in **1** minute.

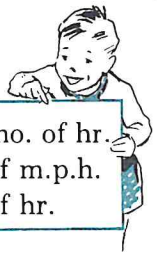
Find the value of:

1.	$3\frac{1}{4} \div 1\frac{1}{12}$	$5\frac{3}{5} \div 2\frac{4}{5}$	$1\frac{1}{4} \div 4\frac{1}{6}$
2.	$2\frac{1}{4} \div 1\frac{1}{2}$	$2\frac{5}{8} \div 1\frac{3}{4}$	$6\frac{1}{9} \div 2\frac{1}{12}$
3.	$8\frac{3}{4} \div 3\frac{1}{8}$	$6\frac{3}{4} \div 1\frac{1}{8}$	$6\frac{1}{3} \div 4\frac{2}{9}$
4.	$3\frac{4}{5} \div 6\frac{1}{3}$	$1\frac{1}{12} \div 1\frac{1}{3}$	$8\frac{1}{6} \div 1\frac{3}{4}$
5.	$1\frac{3}{5} \div 1\frac{1}{15}$	$1\frac{2}{7} \div 3\frac{3}{5}$	$2\frac{7}{9} \div 2\frac{1}{7}$
6.	$7\frac{1}{2} \div 1\frac{1}{5}$	$2\frac{5}{6} \div 2\frac{1}{8}$	$7\frac{1}{9} \div 4\frac{4}{5}$
7.	$6\frac{2}{5} \div 1\frac{3}{5}$	$3\frac{1}{8} \div 6\frac{1}{4}$	$3\frac{3}{5} \div 6\frac{2}{5}$
8.	$2\frac{1}{10} \div 1\frac{2}{5}$	$2\frac{3}{5} \div 3\frac{9}{10}$	$2\frac{3}{4} \div 9\frac{1}{6}$
9.	$4\frac{1}{9} \div 2\frac{1}{3}$	$8\frac{1}{3} \div 2\frac{2}{9}$	$4\frac{1}{3} \div 5\frac{1}{5}$
10.	$4\frac{1}{6} \div 2\frac{6}{7}$	$4\frac{3}{8} \div 2\frac{7}{24}$	$1\frac{1}{9} \div 5\frac{5}{6}$

Divide:

1.	$\frac{7}{10} \div 1\frac{2}{5}$	$\frac{5}{8} \div 2\frac{1}{2}$	$\frac{3}{10} \div 5\frac{2}{5}$
2.	$\frac{7}{12} \div 2\frac{3}{4}$	$\frac{5}{6} \div 2\frac{1}{3}$	$\frac{18}{15} \div 2\frac{2}{3}$
3.	$\frac{4}{15} \div 2\frac{2}{3}$	$\frac{3}{8} \div 2\frac{1}{4}$	$\frac{7}{12} \div 5\frac{1}{4}$
4.	$\frac{1}{4} \div 1\frac{1}{3}$	$\frac{2}{3} \div 4\frac{5}{6}$	$\frac{5}{9} \div 5\frac{5}{6}$
5.	$\frac{2}{3} \div 1\frac{1}{6}$	$\frac{4}{5} \div 1\frac{1}{3}$	$\frac{4}{25} \div 2\frac{2}{15}$
6.	$\frac{1}{3} \div 1\frac{1}{12}$	$\frac{3}{4} \div 2\frac{1}{2}$	$\frac{9}{16} \div 3\frac{3}{8}$
7.	$\frac{3}{4} \div 2\frac{1}{8}$	$\frac{5}{9} \div 4\frac{1}{6}$	$\frac{15}{16} \div 2\frac{1}{12}$
8.	$\frac{4}{9} \div 1\frac{1}{6}$	$\frac{3}{10} \div 2\frac{2}{5}$	$\frac{9}{28} \div 5\frac{1}{7}$
9.	$\frac{1}{2} \div 3\frac{5}{6}$	$\frac{7}{15} \div 4\frac{1}{12}$	$\frac{5}{7} \div 3\frac{3}{14}$
10.	$\frac{5}{6} \div 2\frac{1}{2}$	$\frac{5}{6} \div 1\frac{1}{9}$	$\frac{9}{20} \div 2\frac{4}{25}$

Total Cost	= Cost of 1 × no. bought
No. bought	= Total Cost ÷ Cost of 1
Cost of 1	= Total Cost ÷ no. bought



Distance	= No. of m.p.h. × no. of hr.
No. of hr.	= Distance ÷ no. of m.p.h.
No. of m.p.h.	= Distance ÷ no. of hr.

Problems to Solve

Solve:

1. At $\$2\frac{1}{4}$ a yard, what will $3\frac{1}{3}$ yards of serge cost?

2. Jack's mother paid \$14 for a turkey weighing $17\frac{1}{2}$ lb. How much was that a pound?

3. Matthew paid $\$13\frac{1}{2}$ for $4\frac{1}{2}$ yd. of material. What did it cost per yard?

4. Beef steak is $\$\frac{4}{5}$ per lb. How much will $6\frac{1}{4}$ lb. cost?

5. Eleanor paid \$50 for silk that cost $\$2\frac{1}{2}$ per yd. How many yards did she buy?

6. Find the cost of $12\frac{2}{3}$ yards of carpet at $\$4\frac{1}{2}$ per yard.

7. If $2\frac{3}{4}$ lb. of butter cost $\$2\frac{1}{5}$, how much is that a pound?

8. If Mother paid \$3 for $4\frac{1}{2}$ quarts of ice cream, how much is that a quart?

9. Robert paid \$35 for chairs at $\$3\frac{1}{2}$ each. How many did he buy?

10. Mary bought $6\frac{1}{2}$ yd. of material for $\$3\frac{1}{4}$. How much did she pay per yard?

11. How many $\frac{1}{3}$'s are there in 6?

12. Tom's father is taking a trip of 300 miles by automobile. If it takes him $6\frac{2}{3}$ hr., what is his speed per hour?

13. At 40 miles an hour, how far can Rosemary drive in $3\frac{3}{4}$ hours?

14. Bill drove 215 miles in $5\frac{3}{8}$ hours. What was his speed per hour?

15. Clare rode her bicycle 8 miles in $1\frac{1}{3}$ hr. What was her speed per hour?

16. Two airports are 1080 miles apart. If a pilot can fly this distance in $4\frac{1}{2}$ hours, what is his average speed per hour?

17. The Fifth Grade altar boys had an ice-skating party on Fir Tree Lake. If they skated 5 miles in $1\frac{2}{3}$ hr., how far did they skate in 1 hour?

18. On a bus trip to Maryknoll, Carol traveled 128 miles in $2\frac{2}{3}$ hours. What was the speed per hour?

19. If Mr. Dolan's yacht travels at the rate of 40 m.p.h., how many miles will it travel in $8\frac{1}{5}$ hours?

20. At the rate of 40 m.p.h., how far will a train go in $4\frac{1}{5}$ hr.?

How many 2's are there in 8? This means $8 \div 2 = \frac{8}{2} = 4$. There are 4 two's in 8.
How many 8's are there in 2? This means $2 \div 8 = \frac{2}{8} = \frac{1}{4}$. There is $\frac{1}{4}$ of eight in 2.
How many 4's are there in 12? This means $12 \div 4 = \frac{12}{4} = 3$. There are 3 fours in 12.
How many 12's are there in 4? This means $4 \div 12 = \frac{4}{12} = \frac{1}{3}$. There is $\frac{1}{3}$ of 12 in 4.
How many 5's are there in 10? This means $10 \div 5 = \frac{10}{5} = 2$. There are 2 fives in ten.
How many 10's are there in 5? This means $5 \div 10 = \frac{5}{10} = \frac{1}{2}$. There is $\frac{1}{2}$ of 10 in 5.

The line between the numerator and the denominator indicates division.
The denominator is the divisor. The numerator is the dividend.
In the fraction $\frac{4}{3}$, 4 is the dividend, 3 is the divisor, $1\frac{1}{3}$ is the quotient.
In the fraction $\frac{3}{4}$, 3 is the dividend, 4 is the divisor, $\frac{3}{4}$ is the quotient.

LESSON 11. Fractions Express Division

Express the quotient as a fraction, a mixed number, or a whole number:

1.	$6 \div 18$	$8 \div 3$	$4 \div 10$
2.	$9 \div 36$	$7 \div 4$	$20 \div 3$
3.	$12 \div 24$	$10 \div 3$	$5 \div 6$
4.	$8 \div 16$	$14 \div 6$	$16 \div 5$
5.	$3 \div 12$	$15 \div 7$	$6 \div 20$
6.	$5 \div 10$	$18 \div 4$	$26 \div 8$
7.	$8 \div 24$	$20 \div 3$	$5 \div 9$
8.	$9 \div 27$	$42 \div 4$	$18 \div 20$
9.	$10 \div 20$	$26 \div 5$	$16 \div 6$
10.	$15 \div 20$	$30 \div 18$	$6 \div 7$
11.	$25 \div 7$	$4 \div 16$	$8 \div 9$
12.	$3 \div 8$	$9 \div 18$	$21 \div 6$

Give the answers orally:

1. The fraction $\frac{5}{6}$ means (?) divided by (?).
2. Division may be expressed as a (?).
3. In a fraction such as $\frac{10}{9}$, the divisor is (?), the dividend is (?), and the quotient is (?).
4. In a fraction, such as $\frac{12}{4}$, the quotient is a (?) number.
5. In a fraction such as $\frac{3}{8}$, the quotient is a (?) fraction.
6. In a fraction, such as $\frac{11}{8}$, the quotient is a (?) number.
7. In the fraction $\frac{5}{9}$, the divisor is (?).
8. In the fraction $\frac{7}{12}$, the dividend is (?).
9. In the fraction $\frac{5}{4}$, the quotient is (?).
10. In the fraction $\frac{10}{9}$, the dividend is (?).

Practice With Fractions

Watch the signs:

1. $6 \times \frac{5}{12} = ?$ $\frac{3}{8}$ of $24 = ?$ $2\frac{1}{4} \times 9 = ?$
2. $8 \times 4\frac{1}{4} = ?$ $18 \times \frac{7}{12} = ?$ $16 \times 5\frac{1}{3} = ?$
3. $\frac{9}{10} \div \frac{9}{10} = ?$ $\frac{7}{11} \times 3 = ?$ $\frac{7}{10} \div \frac{3}{5} = ?$
4. $9 \times \frac{5}{6} = ?$ $32 \div \frac{2}{3} = ?$ $\frac{15}{28}$ of $\frac{21}{35} = ?$
5. $6 \times 10\frac{1}{8} = ?$ $\frac{3}{4} \div 18 = ?$ $\frac{5}{6} \div 10 = ?$
6. $\frac{5}{12} \times 32 = ?$ $8 \times \frac{7}{12} = ?$ $\frac{3}{7}$ of $35 = ?$
7. $8 \times \frac{3}{10} = ?$ $6\frac{2}{5} \times 3 = ?$ $18 \div \frac{2}{3} = ?$
8. $4\frac{1}{2} \times 6 = ?$ $\frac{9}{28}$ of $\frac{14}{15} = ?$ $2\frac{1}{4} \div \frac{3}{5} = ?$
9. $112 \times 23\frac{3}{4} = ?$ $\frac{4}{5} \div 16 = ?$ $3\frac{7}{8} \times 28 = ?$
10. $\frac{3}{25}$ of $\frac{15}{16} = ?$ $\frac{5}{14}$ of $56 = ?$ $7 \times 3\frac{1}{2} = ?$
11. $8 \div \frac{3}{4} = ?$ $5\frac{1}{3} \div \frac{2}{3} = ?$ $7\frac{1}{2} \div 22\frac{1}{2} = ?$
12. $10 \div 2\frac{1}{2} = ?$ $7\frac{1}{2} \div 12 = ?$ $9\frac{1}{2} \div \frac{3}{4} = ?$
13. $\frac{3}{4} \div \frac{9}{16} = ?$ $2\frac{2}{9} \times 1\frac{1}{5} = ?$ $12\frac{1}{2} \div 1\frac{1}{4} = ?$
14. $\frac{5}{6} \div \frac{3}{8} = ?$ $18 \div 4\frac{1}{2} = ?$ $31\frac{1}{2} \div 2\frac{1}{4} = ?$
15. $\frac{9}{10} \div \frac{7}{15} = ?$ $3\frac{1}{2} \div \frac{7}{9} = ?$ $\frac{5}{8} \div \frac{7}{12} = ?$
16. $4\frac{2}{3} \times \frac{6}{7} = ?$ $8\frac{1}{6} \div 1\frac{1}{6} = ?$ $\frac{4}{9} \div 8 = ?$
17. $5\frac{1}{4} \div \frac{3}{32} = ?$ $\frac{4}{5} \times \frac{3}{8} = ?$ $\frac{3}{4} \times 3\frac{1}{3} = ?$
18. $3\frac{1}{6} \times 1\frac{1}{5} = ?$ $\frac{9}{16} \div 4\frac{1}{2} = ?$ $7\frac{1}{2} \div 1\frac{3}{5} = ?$
19. $2\frac{1}{4} \div 12 = ?$ $5\frac{1}{2} \div \frac{3}{4} = ?$ $10 \div \frac{9}{20} = ?$
20. $6\frac{1}{8} \div 14 = ?$ $2\frac{1}{2} \times 4\frac{2}{3} = ?$ $\frac{7}{12} \div 4\frac{2}{3} = ?$

Solve:

1. How many $1\frac{1}{2}¢$ stamps can Paul buy for $30¢$?
2. If a basket holds $\frac{3}{4}$ bu., how many bu. of peaches will there be in $4\frac{1}{2}$ baskets?
3. If Miriam divides $\frac{3}{4}$ of a cake into 6 equal slices, what part of the cake will each slice be?
4. Find the cost of $5\frac{1}{3}$ yd. of ribbon at $7\frac{1}{2}¢$ a yard.
5. If each child at the party is served $\frac{1}{8}$ qt. of ice cream, how many children can be served from $2\frac{1}{4}$ qt.?
6. How many pieces of board $1\frac{1}{4}$ ft. long can be cut from a board $8\frac{3}{4}$ ft. long?
7. If it costs Marie $4\frac{1}{2}¢$ an hour to run the electric sweeper, how much will it cost to run it $\frac{2}{3}$ of an hour?
8. If an airplane goes $2\frac{1}{4}$ miles in 1 minute, how far will it go in $3\frac{2}{3}$ minutes?
9. If an airplane goes $2\frac{1}{3}$ mi. in 1 minute, how long will it take it to go 35 miles?
10. What is the speed per minute of an airplane that goes $8\frac{1}{3}$ miles in $2\frac{1}{2}$ minutes?
11. A recipe calls for $2\frac{1}{2}$ cups of sugar. If Ann is making $\frac{1}{2}$ of the amount called for in the recipe, how much sugar will she use?
12. Clare is making badges $3\frac{3}{4}$ inches long. How many can she make from 30 inches of ribbon?

Measure Your Progress

Watch the sign:

1. $\frac{3}{4}+\frac{5}{8}=?$ $8\frac{1}{5}-\frac{1}{5}=?$ $3\frac{2}{3}\times1\frac{5}{7}=?$
2. $\frac{7}{9}-\frac{1}{6}=?$ $3+\frac{7}{8}=?$ $2\frac{7}{9}\div1\frac{17}{18}=?$
3. $\frac{10}{21}\times\frac{12}{35}=?$ $8\times\frac{7}{8}=?$ $4\frac{1}{6}-2\frac{7}{9}=?$
4. $\frac{8}{15}\div\frac{28}{45}=?$ $\frac{7}{8}\div8=?$ $6\frac{3}{8}+2\frac{7}{10}=?$
5. $\frac{7}{8}+\frac{3}{5}=?$ $6\frac{1}{3}-\frac{5}{8}=?$ $5\frac{4}{9}+\frac{4}{9}=?$
6. $\frac{7}{15}-\frac{5}{12}=?$ $3\frac{3}{20}\times\frac{10}{21}=?$ $2\frac{1}{2}\div\frac{2}{5}=?$
7. $\frac{20}{27}\div\frac{15}{36}=?$ $6\frac{1}{9}-\frac{5}{6}=?$ $1\frac{1}{9}\times\frac{9}{10}=?$
8. $6-\frac{3}{8}=?$ $5+2\frac{7}{8}=?$ $\frac{7}{9}+2=?$
9. $\frac{5}{9}\div\frac{5}{9}=?$ $4-3\frac{1}{9}=?$ $\frac{8}{15}+3\frac{7}{12}=?$
10. $4\frac{1}{3}-4=?$ $\frac{39}{50}\times5\frac{10}{13}=?$ $9\div\frac{6}{7}=?$
11. $3\frac{1}{2}-\frac{1}{2}=?$ $2\frac{1}{2}+4\frac{2}{3}=?$ $6\frac{2}{3}\div1\frac{7}{8}=?$
12. $8\frac{1}{3}\div2\frac{2}{9}=?$ $5\frac{1}{7}\times\frac{14}{9}=?$ $8\frac{1}{2}-3\frac{7}{9}=?$
13. $5\frac{3}{5}\div1\frac{1}{10}=?$ $4\frac{3}{4}\times1\frac{1}{8}=?$ $10\frac{1}{6}-4\frac{7}{12}=?$
14. $7\frac{5}{12}-6\frac{11}{20}=?$ $8\frac{4}{9}+7\frac{2}{3}=?$ $5\frac{3}{7}\times1\frac{3}{11}=?$
15. $1\frac{3}{8}+\frac{1}{4}+5+1\frac{5}{16}=?$ $\frac{3}{4}+\frac{1}{2}+\frac{2}{9}+4=?$
16. $10\frac{1}{2}+3\frac{5}{6}+9+4\frac{1}{18}=?$ $7\frac{1}{4}+3\frac{1}{12}+8=?$
17. $6\frac{3}{5}+6+7\frac{7}{10}+9\frac{4}{15}=?$ $8\frac{1}{2}+3\frac{3}{4}+6\frac{3}{5}=?$
18. $3\frac{1}{3}+4\frac{5}{6}+7\frac{7}{12}+1\frac{1}{4}=?$ $4\frac{1}{7}+3\frac{5}{14}+5=?$

1. If it takes Miss Jacovina $4\frac{1}{2}$ minutes to type one page how long will it take her to type 30 pages?
2. If it takes Alice $3\frac{1}{3}$ minutes to read one page of her storybook, how many pages can she read in $4\frac{1}{6}$ minutes?
3. John rode $2\frac{3}{8}$ miles on Monday, $2\frac{3}{4}$ miles on Tuesday, $4\frac{5}{6}$ miles on Wednesday. How far did he ride on the three days?
4. From a piece of serge $6\frac{1}{2}$ yards long $2\frac{5}{8}$ yards have been used. How many yards remain?
5. Richard gained $3\frac{1}{2}$ pounds in 7 days. What was the average gain each day?
6. Bob has $\frac{1}{4}$ of a dollar, Jack has $\frac{7}{20}$ of a dollar, and Michael has $\frac{2}{5}$ of a dollar. Does the sum of their money equal a whole dollar?
7. Mary Ellen has $\$2\frac{1}{2}$ in her bank. Ann has $\$3\frac{1}{4}$. How much more has Ann than Mary Ellen?
8. Mary's father is 35 years old. Mary is $\frac{2}{7}$ as old as her father. How old is Mary?
9. Francis wants to buy a camera which sells for \$15. He has already saved $\frac{4}{5}$ of this amount. How much has he saved?
10. Mrs. Simpson had $4\frac{1}{2}$ oranges. Into how many $\frac{1}{4}$'s can she divide them?

Measure Your Progress

1. A farmer sold chickens weighing $3\frac{7}{8}$ lb., $5\frac{3}{4}$ lb., $1\frac{1}{2}$ lb., and $4\frac{5}{8}$ lb. What was the total weight of all the chickens?

2. Mother bought $3\frac{1}{3}$ lb. of steak at 60¢ a pound, and $6\frac{3}{4}$ lb. of ham at 80¢ a pound. What was the amount of her bill?

3. Mrs. Campbell bought $5\frac{3}{4}$ yd of gingham, $3\frac{1}{4}$ yd. of percale, and $6\frac{3}{4}$ yd. of linen. She used all but $1\frac{1}{2}$ yd. of this material for dresses. How much did she use?

4. Last year Jim weighed $52\frac{1}{2}$ lb. This year he weighs $69\frac{1}{4}$ lb. How many pounds has he gained?

5. A basket of fruit weighs $10\frac{1}{2}$ lb. The basket weighs $1\frac{7}{8}$ lb. What does the fruit weigh?

6. Dan earned $\$107\frac{1}{4}$ in $16\frac{1}{2}$ weeks. How much did he earn in one week?

7. Patricia weighs $54\frac{1}{4}$ lb. Rose weighs $61\frac{3}{4}$ pounds. Eleanor weighs 67 lb. Find their average weight?

8. At a track meet Bob jumped $9\frac{3}{4}$ feet and Jack jumped $10\frac{1}{5}$ ft. How much farther did Jack jump?

9. Jack's father paid \$123.05 for $11\frac{1}{2}$ tons of coal. How much did one ton cost?

10. At a candy sale Jane packed $10\frac{1}{4}$ lb. of candy into $\frac{1}{4}$ lb. boxes. How many boxes did she fill?

11. If the sum of two numbers is $17\frac{1}{4}$ and one of the numbers is $2\frac{7}{8}$, what is the other number?

12. It takes Paul $2\frac{1}{2}$ hours to mow the lawn. At 25¢ an hour, how much does he earn by mowing the lawn 6 times while he is at home?

13. I can travel $166\frac{1}{4}$ miles in $4\frac{3}{4}$ hours. How far can I travel in 6 hours?

14. If $\frac{5}{8}$ in. represents a mile, how many inches will represent 12 miles?

15. Fred feeds his pony $\frac{1}{8}$ bu. of oats each day. In how many days will the pony eat $4\frac{1}{2}$ bu.?

16. Rosemary has $24\frac{1}{4}$ inches more to knit on her sweater. If she can average $4\frac{1}{2}$ in. in 1 hour, in how many hours can she finish the sweater?

17. If it takes $4\frac{1}{2}$ hours to drive to and from another city, and if we spend $5\frac{1}{4}$ hours there, how many hours is that?

18. Mother weighs $138\frac{1}{2}$ lbs. Father weighs $205\frac{1}{4}$ lbs. How many more pounds does Father weigh?

19. Sister cut 45 ties from a bolt of ribbon that contained $56\frac{1}{4}$ yards. How long was each tie?

20. Jane has 3 dimes, 4 nickels, and 7 pennies. How many cents is that?

UNIT 5 Test

Write the answers on your test paper:

Part I

1. $\frac{3}{8}$ of $\frac{4}{9}$ means $\frac{3}{8}$ (?) $\frac{4}{9}$.

2. How many $\frac{3}{4}$'s are there in 18, may be expressed $18 \div$ (?).

3. In a division example involving fractions the divisor always follows the (?) sign.

4. When we cancel we divide a (?) and a (?) by the (?) number.

5. To invert $\frac{7}{9}$ we write (?).

6. $\frac{4}{9} \div \frac{1}{3}$ gives the same answer as $\frac{4}{9} \times$ (?).

7. To multiply fractions, multiply the (?) and multiply the (?).

8. To multiply $3\frac{1}{4}$ by $\frac{4}{5}$, first change $3\frac{1}{4}$ to (?).

9. To divide a mixed number by a proper fraction, change the mixed number to an (?) fraction, change the $\div$ sign to a (?) sign, (?) the divisor, and continue as in multiplication.

10. The denominator of a whole number such as 8 is (?).

11. The value of 3 divided by $\frac{1}{3}$ is the same as the value of (?) $\times$ (?).

12. The value of $\frac{1}{3}$ divided by 3 is (?).

Part II

1. $\frac{15}{16} \times \frac{12}{25}$
   In order to cancel
   Divide 15 and 25 by (?).
   Divide 16 and 12 by (?).

2. $6 \div 2$ may be written as the fraction (?).
   The denominator is (?), the numerator is (?), and the answer is (?).

3. $2 \div 6$ may be written as the fraction (?).
   The numerator is (?), the denominator is (?), and the answer is (?).

4. Write as fractions:
   $5 \div 8 =$? $4 \div 9 =$? $10 \div 7 =$?

5. When we divide 12 by 5, the quotient is a (?) number.

6. When we divide 8 by 4, the quotient is a (?) number.

7. When we divide 5 by 12, the quotient is a (?) fraction.

8. Which number do you invert in these examples?
   $\frac{3}{4} \div \frac{1}{2}$ (?) $\frac{1}{9} \div \frac{2}{3}$ (?) $2\frac{5}{8} \div 4\frac{1}{2}$ (?)

9. When we divide a whole number such as 6, by a proper fraction, such as $\frac{1}{3}$, the quotient is greater than the (?).

10. When we divide a whole number such as 9, by a mixed number, such as $2\frac{1}{4}$, the quotient is (?) than the dividend.

Part III

1. Mother has $2\frac{1}{2}$ pies to serve 20 people. What part of a pie will each receive?

2. John has $\frac{3}{4}$ of a yard of rope. He uses $\frac{1}{2}$ of it. What part of a yard does he use?

3. Find the cost of $2\frac{1}{4}$ dozen buttons at 32¢ a dozen.

4. Philip has to walk $8\frac{3}{4}$ miles to reach his uncle's farm. If it takes him $2\frac{1}{3}$ hours, what is his walking speed per hour?

5. If the average length of Richard's steps in walking is $1\frac{1}{3}$ ft., how many steps will he take in walking 68 feet?

6. If a horse eats $\frac{3}{4}$ bu. of oats a day, how long will 12 bushels last?

7. During a recent heavy rain $\frac{11}{12}$ inches of rain fell in $3\frac{2}{3}$ hours. What part of an inch did this average in 1 hour?

8. Candy bars are packed $2\frac{1}{2}$ dozen to a box. How many boxes will be needed to pack $32\frac{1}{2}$ dozen bars?

9. Martha spent $\frac{5}{6}$ of an hour solving problems in arithmetic. If she averaged $\frac{1}{12}$ of an hour on each problem, how many did she solve?

10. If a watch loses $\frac{3}{20}$ of a second in one day, in how many days will it have lost $\frac{3}{5}$ of a second?

Part IV

Match column B with column A

		B	
1.	(?) $2\frac{3}{5} \div 3\frac{4}{9}$	a.	$1\frac{1}{5}$
2.	(?) $\frac{3}{4} \times \frac{1}{3}$	b.	$\frac{2}{3} \times \frac{4}{3}$
3.	(?) $6 \div 5$	c.	$\frac{9}{2} \times \frac{1}{6}$
4.	(?) $\frac{8}{15} \times \frac{35}{36}$	d.	$\frac{2}{3} \times \frac{3}{4}$
5.	(?) $5 \div 6$	e.	$\frac{13}{5} \times \frac{9}{31}$
6.	(?) $4\frac{1}{2} \div 6$	f.	4×2
7.	(?) $\frac{2}{3} \div \frac{3}{4}$	g.	$\frac{5}{6}$
8.	(?) $\frac{7}{10} \div \frac{7}{10}$	h.	$\frac{14}{27}$
9.	(?) $\frac{2}{3}$ of $\frac{3}{4}$	i.	$\frac{1}{3} \times \frac{3}{4}$
10.	(?) $4 \div \frac{1}{2}$	j.	1

Part V

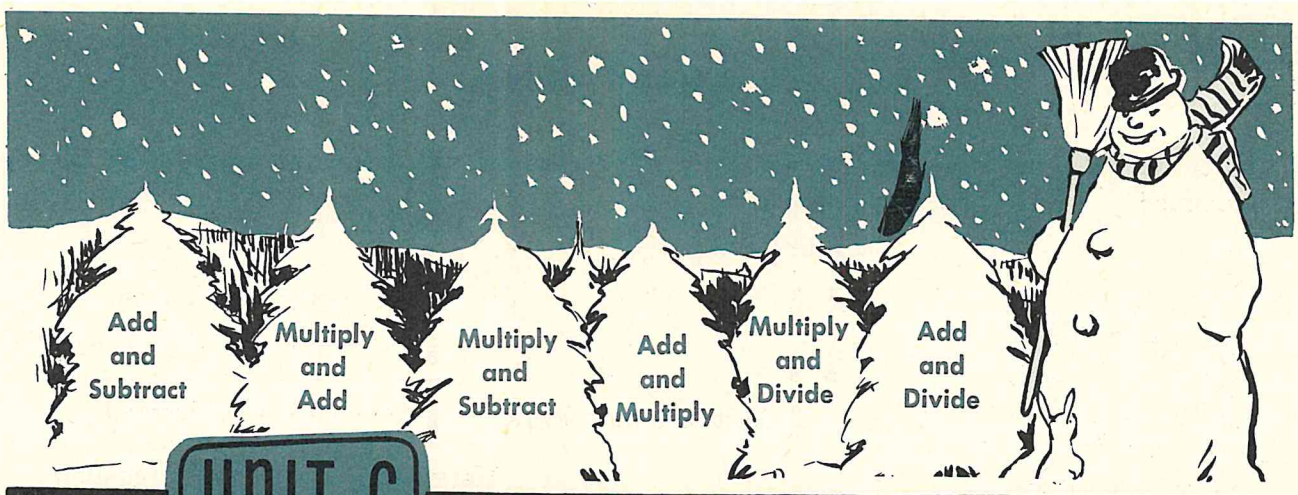
1. Which is greater $\frac{9}{12}$ or $\frac{8}{12}$?

2. Change $\frac{3}{4}$ to 12ths.
   Change $\frac{2}{3}$ to 12ths.
   Which is greater $\frac{3}{4}$ or $\frac{2}{3}$?

3. Is $\frac{7}{10} \times 20$ the same value as $20 \times \frac{7}{10}$?

4. Is $\frac{8}{9} \div \frac{1}{3}$ the same value as $\frac{1}{3} \div \frac{8}{9}$?

5. How many $\frac{3}{4}$'s are there is 12?



UNIT 6 • TWO-STEP PROBLEMS

A One-step problem presents a single idea. A Two-step problem presents two ideas. In a Two-step problem there are always two questions to be considered. One of these questions is hidden. Before we can find the answer to the second question, we must find the answer to the *hidden* question. Watch for the *hidden* question.

How Well Do You Remember?

Give the answers orally:

1. A two-step problem presents ....(?)..... ideas; it is really ....(?)..... problems in one.

2. In a two-step problem one of the questions is ....(?)....

3. We must first discover the ....(?)..... question and ....(?)..... it before we can answer the ....(?)..... one.

4. Agnes saved 460 foreign stamps and 780 domestic stamps. Her stamp album holds 2000 stamps. How many more does she need to fill the book? ....(?)....
   In the above problem, what is the hidden question? What process is required in the hidden question? What process is required in the second question?

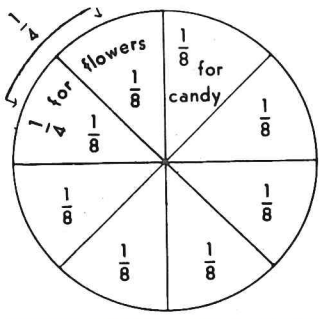
5. Miss Bonner works 8 hours a day, and receives $1.15 per hour. How much does she earn in 5 days. In the above problem, what is the hidden question? What process is required in the hidden question? What process is required in the second question?

6. Ruth's scores in Arithmetic during the past five days have been 85%, 90%, 80%, 90%, 95%. What is her average mark for the week?
   In the above problem, the process to be used in the first question is ....(?)....., and in the second question it is ....(?)....

7. On a fishing trip 28 scouts agreed to share equally all the fish they caught. If they caught 7 trout, 11 blue fish, 21 sun fish, and 17 bass, how many fish did each boy receive?

Two-Step Problems

Mary spent $\frac{1}{4}$ of her money for flowers and $\frac{1}{8}$ of it for candy. What fractional part of her money remained?



Step 1:

Add $\frac{1}{4}$ and $\frac{1}{8}$.

$\frac{1}{4} = \frac{2}{8}$

$\frac{1}{8} = \frac{1}{8}$

$\frac{3}{8}$ fractional part spent.

Step 2:

$\frac{8}{8}$ represents Mary's money

$\frac{3}{8}$ represents what Mary spent

$\frac{5}{8}$ represents what remained

Mary had $\frac{5}{8}$ of her money remaining

Hidden question: What fractional part of her money did Mary spend?

1. If John spent $\frac{1}{3}$ of his money for a ball and $\frac{1}{6}$ of it for a book, what fractional part of his money remained?

2. Robert spent $\frac{3}{8}$ of an hour studying English, and $\frac{1}{4}$ of an hour studying history, and the rest of the hour in doing arithmetic. What fractional part of an hour did Robert spend on his arithmetic?

3. Ellen read $\frac{3}{5}$ of her new story book on Wednesday and $\frac{1}{4}$ of it on Thursday. What fractional part of the book did Ellen still have to read?

4. Tom spends $\frac{3}{8}$ of the day in bed, and $\frac{1}{4}$ of the day in school. What fractional part of the day is left for other things?

5. Ruth gave away $\frac{1}{3}$ of her candy to her brother, $\frac{1}{4}$ of it to her sister, and she ate the remainder. What fractional part did she eat?

6. Frank spent $\frac{3}{8}$ of his savings on his mother's Christmas present, and $\frac{2}{5}$ on his father's present. What fractional part had he left?

7. David's father spent \$36.50 for a bicycle and \$19.95 for a tool set. What change had he left from \$60?

8. Maureen saved \$.84 one month and \$.92 the second month. How much more does she need to make \$2.00?

9. The Scott family bought two turkeys for the family reunion. One turkey weighed $22\frac{1}{2}$ lb., the other weighed $18\frac{3}{4}$ lb. How much less than 50 lb. of turkey did the Scotts buy?

10. Three girls together made 130 pieces of fudge. Patricia made 36 pieces, and Alice made 48 pieces. How many did the third girl make?

11. Joe weighs $85\frac{3}{8}$ lb., Sally weighs $72\frac{3}{4}$ lb. Their father weighs 160 lb. How much more is his weight than the children's combined weights?

12. The children needed 10 dozen favors for their party. Joan made $3\frac{3}{4}$ dozen, May made $2\frac{5}{6}$ dozen, and Margaret made the rest. How many did Margaret make?

Before Christmas, at the Christ Child Party, our school collects for those in need. Last year the fourth grade collected $32. The fifth grade collected $1\frac{1}{2}$ times as much. How much did the two grades collect?

Hidden question—How much did the fifth grade children collect?

Step 1

$1\frac{1}{2}$ times **$32**

$\frac{3}{\cancel{2}} \times \frac{\overset{16}{\cancel{32}}}{1} =$ **$48**

The fifth grade collected **$48.**

Step 2

$48.00 fifth grade
32.00 fourth grade
$80.00 both grades collected

The Christ Child Party

1. In our school a Christ Child Party was given for the poor. We collected enough money to buy 35 pairs of shoes at $5.75 a pair. In addition to this, one benefactor donated $50 to be used for the same purpose. How much money did they receive in all?

2. In our room we bought 48 pairs of stockings at $\$\frac{3}{4}$ a pair, and then had $15 left to be used for other needs. How much did we collect altogether?

3. For the Party, Jane's mother made 18 boxes of fudge with 45 pieces in each box, and John's mother made a big pan with 120 pieces in it. How many pieces of fudge did we have for sale?

4. For the Christ Child Party 37 of the fifth grade children each brought 3 cans of soup. Another group brought 60 cans of soup. How many cans were brought altogether?

5. When the toys were packed for the orphanage 30 boxes of 25 toys each were sent. If 225 of these toys were for babies, how many were for the older children?

6. The eighth grade children brought sugar and coffee. 35 children brought 5 lbs. of sugar each, and 40 others brought 80 lbs. of coffee. How many more pounds of sugar were brought than of coffee?

7. Each of the 65 children in the fourth grade donated $.50 to the Christ Child Party. If $8.75 was used for sugar to make candy, how much money was left?

8. The children of Saint Francis School have 2300 tickets for the Christ Child Play. If 335 children have sold 5 tickets each, how many are yet to be sold?

Last year one group of trappers secured **234** pelts and another group secured **367**. If these skins were sold for **$1.05** each, for what amount of money were all the skins sold?

Step 1

234
367
601 = total number of skins sold

Step 2

$1.05 = S. P. of **1** skin
6 01
1 05
630 0
$631.05 = S. P. of **601** skins

Practice With Problems

1. If a team of Eskimo dogs travels $26\frac{3}{4}$ miles in the morning and $30\frac{7}{8}$ miles in the afternoon, how many miles will the team cover in 8 days?

2. A trapper sold 35 marten skins and 57 beaver skins. If he received $10.50 for each skin, how much did he receive in all?

3. The Canadian fur industry lists the value of some furs for one year: Martens and minks, $300,000; beavers, $175,000; ermine, $58,000; and bears $70,000. In 5 years what would be the value of these skins alone?

4. There are about 65,000 Catholic Indians and 1500 Catholic Eskimos in Canada. In Montreal the French Catholic population is about $13\frac{1}{2}$ times the combined number of Indians and Eskimos. What is the Catholic population of Montreal?

5. On a hunting trip Mr. Clark netted a load of 18 skins each weighing 12 lbs. If he had 9 dogs to his sled team, how many pounds did each dog pull?

6. A hunter traveled $2\frac{1}{4}$ miles each day for 4 days. Throughout the entire distance he set 12 traps which were spaced equally distant. How far apart were they?

7. A party of hunters trapped 54 silver gray foxes. If each pelt netted $56, how much did each of the 6 hunters receive?

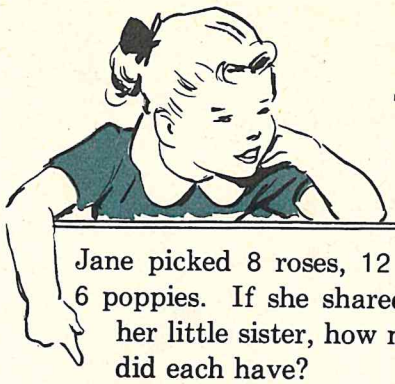
8. Every full grown beaver weighs about 55 lbs. If 25 of these were hauled by 9 dogs, what weight did each dog pull?

9. In one year 385 whales taken in Alaskan waters yielded products worth $502,040. What was the value of the products yielded by each whale?

Practice With Problems

THE TWO-STEP PROBLEM

To share with another divide by 2
To share with 2 divide by 3
To share with 3 divide by 4



Jane picked 8 roses, 12 daisies, and 6 poppies. If she shared them with her little sister, how many flowers did each have?

Step 1

8
12
6
26

Step 2

To share with another, divide by **2**.

$2\overline{)26}$ = number of flowers each received

Result: **13** flowers

Frank had 32 blue marbles, 12 brown ones, 15 white ones, and 9 yellow ones. If he shared them with his 3 friends, how many did each boy receive?

Step 1

32
12
15
68 = total number of marbles

Step 2

To share with **3** others, divide by **4**.

$4\overline{)68}$ = number of marbles each boy received

Result: **17** marbles

1. Grace has a box containing 54 pieces of brown fudge and 66 pieces of yellow fudge. If she shares this candy with 9 of her classmates, how many pieces will each have?

2. Peter's mother gave him a box of cookies to share with his 6 friends. If there were 28 square cookies, 20 triangular and 36 round ones, how many did each boy receive?

3. Mr. Joyce brought home a box of stamps. He told Tom to share them with the other 5 children in the family. If there were 84 foreign stamps and 198 domestic, how many did each receive?

4. Nancy collected shells at the shore and brought home 42 pink ones, 35 blue ones, 50 white ones, and 27 black ones. If she shared them with 13 of her classmates, how many did each have?

5. Judy had 9 blue ribbons, 15 pink ones, and 11 yellow ones. She shared them with 4 of her friends. How many did each receive?

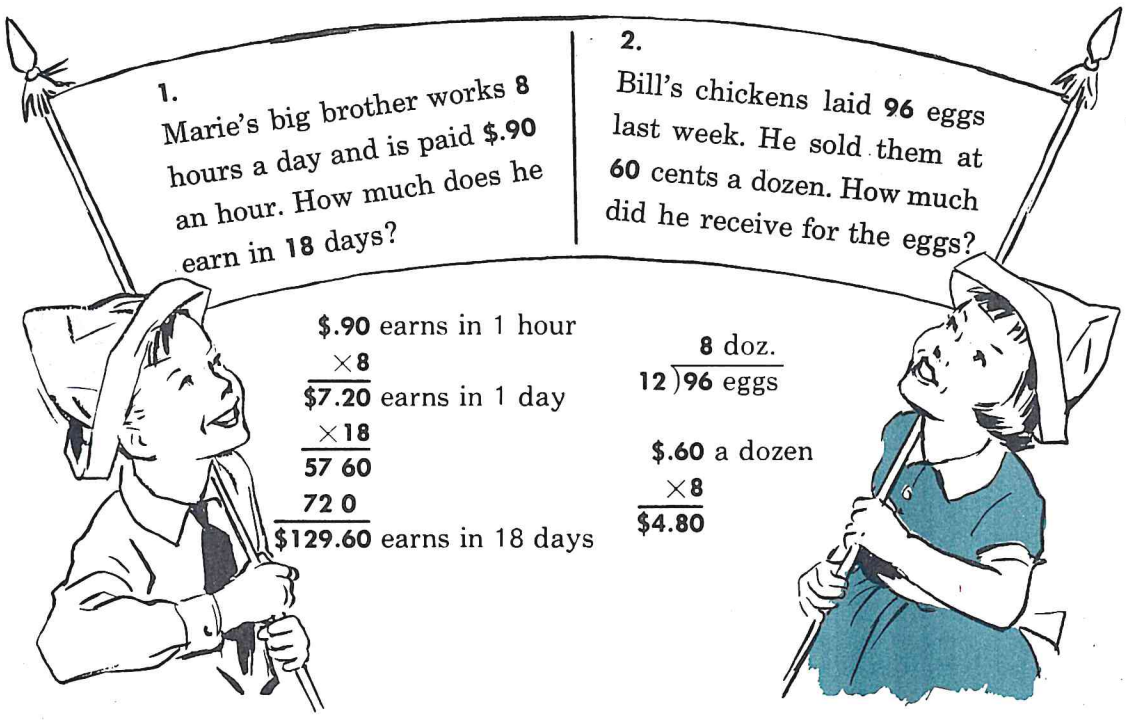
6. In his bookcase Joseph has collected 12 books on Adventure, 21 on Airplanes, 8 on History, and 14 on Boy Saints. If he shares his books, with his 4 brothers, how many will each have?

7. Paul has 54 baseball cards, 48 football cards, 35 basketball cards, and 67 cowboy cards. If he shares them with his three friends, how many cards does each receive?

8. Sister had 80 gold stars, 72 silver, 65 blue, and 58 red ones. She gave them to Madge to share with 10 other girls. How many did each receive?

9. Father King gave John some medals to share with 15 other boys. There were 12 miraculous, 20 scapular, and 16 St. Joseph medals. How many did each boy receive?

10. The fruit dealer gave Sister some fruit for her kindergarten children. There were 18 oranges, 22 apples, and 41 bananas. Sister gave them to Danny to share with his 8 companions. How many pieces of fruit did each receive?



1. Marie's big brother works **8** hours a day and is paid **$.90** an hour. How much does he earn in **18** days?

$.90 earns in 1 hour
$\times 8$
$7.20 earns in 1 day
$\times 18$
57 60
72 0
$129.60 earns in 18 days

2. Bill's chickens laid **96** eggs last week. He sold them at **60** cents a dozen. How much did he receive for the eggs?

8 doz.
12)**96** eggs

$.60 a dozen
$\times 8$
$4.80

Practice With Problems

1. Tom works 8 hours a day and receives $1.20 an hour. How much will he earn in 24 working days?
2. If an airplane pilot can fly his plane 4 miles per minute, how many miles will he have covered over a period of 25 flying hours?
3. If a motor makes 35 revolutions in a second, how many will it make in an hour?
4. Helen decided to read 13 pages of her book every day. How many pages will she have read at the end of 4 weeks?
5. Jack saves $.15 a week. How much will he have saved at the end of 10 months?
6. A dealer had 600 dozen oranges. He packed them 12 dozen to a crate, and sold them at $3.50 a crate. How much did he receive for the oranges?
7. In a certain school there are 24 classrooms. If each room sells an equal share of 1440 tickets at $.75 apiece, how much money will each room collect?
8. A farmer delivered 132 eggs to a certain store. If he charged 70 cents a dozen for them, how much did he receive for the eggs?
9. A train covers 405 miles in 9 hours. At this same rate of speed, how far will it go in 12 hours?
10. Apples are 3 for 27¢. What will Jane pay for 14 of them?
11. Cupcakes are 60¢ a dozen. How much will Agnes pay for 27 of them?
12. Pencils are $7.20 a gross. What will Mary Anne pay for 15 of them?

Two-Step Problems

Warning:——Watch for the hidden question!

÷ ÷ — × — ÷

1. Joe spent $.60 for marbles at 2 cents apiece. He shared them with his two brothers. How many marbles did each boy receive?

2. A U. S. Navy officer was making a trip of 2700 miles. He went $\frac{1}{3}$ of the journey by plane at the rate of 120 miles per hour. How many hours did it take to cover the distance traveled by plane?

3. John deposited $4.80 in the bank during the past 4 months. At this rate, how many months will it take him to save $10.80?

4. Agnes saved $7.20 in 8 weeks. How many weeks will it take her to save $18.90?

5. Mr. Becker sold 5,844 dozens of copybooks in 6 weeks. At this rate, how many weeks will it take him to sell 19,480 dozens?

6. Bill's father buys potatoes at $5.75 a bag. He sells them by the pound, and receives $9.34 for the potatoes from 1 bag. How much profit will Bill's father make if he sells 25 bags of potatoes?

7. A wholesale furniture house buys chairs for $4.50 each. They sell them for $5.75 apiece. Find the gain on 35 chairs.

8. Divide 1674 by 31 and multiply the quotient by 15.

9. A clothing salesman purchased men's suits for $20.50. He sold them for $29.75 each. What was his profit on 40 suits?

10. There are 420 pages in Betty's library book. She has read 126 of them. How many pages a day must Betty read in order to finish it before she returns it to the library in 6 days?

11. Joan wants to buy a camera that will cost $11.50. She has $5.00. She can earn the remainder by working after school at $.30 an hour. How many hours must Joan work?

12. Father saved $50 in a month. Mother saved $10 less than this. Francis saved only $\frac{1}{4}$ of Mother's amount. How much did Francis save?

13. Ann Louise saved 1,808 foreign stamps. She sold 578 of them. The remainder she arranged on 41 pages in her album. How many stamps were on each page?

14. Ted had a board $16\frac{1}{2}$ ft. long. He cut off $4\frac{1}{2}$ ft. to mend the step. How many 3-foot boards could be cut from the remainder?

15. From $10\frac{1}{2}$ take $5\frac{1}{4}$ and multiply your remainder by $1\frac{3}{4}$.

16. Take $8\frac{1}{8}$ from $18\frac{1}{4}$ and divide the remainder by $10\frac{1}{4}$.

More Two-Step Problems

Warning:——Watch for the hidden question!

+ + − − + ÷

1. Bill earned $24 last week and Henry earned $26. Their father earned as much as both Bill and Henry together. How much did the three earn?

2. Jane, Don, and Harry wanted to buy a new sewing machine for their mother for Christmas. Jane gave $15, Don gave $20, and Harry gave as much as Jane and Don together. How much did they all give?

3. During November our school collected $105 for the foreign missions. Another school collected $93, and a third school collected $10 more than the first two schools together. How much did the third school collect?

4. Grace saved $5.00. She bought a hat for $2.60, and would like to buy a dress marked $7.60. How much money would Grace need?

5. Joe's big brother had $125.00 in bank, which he withdrew. He spent $39.50 on clothes, and wanted to take a trip that would cost $90.00. Did he have sufficient money, or was he short, and how much?

6. A boy had collected 265 stamps. He lost 98 of them. How many more stamps must he collect to raise his number to 200?

7. For the school library this week 6 new books have been purchased. Their prices are $2.50, $3.00, $2.00, $1.75, $3.25, and $3.50. What is the average price of a book?

8. The boy scouts went for 5 Sunday hikes. They walked the following distances: 6 miles, 7 miles, $4\frac{1}{2}$ miles, $5\frac{1}{2}$ miles, 8 miles. How many miles did they average on a hike?

9. The Whelans went for an automobile trip. The first day they drove 240 miles, the second, 280 miles, and the third, 300 miles. What was their average daily speed?

10. The weights on the health record of five fifth grade boys are: 86 lb., 90 lb., 84 lb., 88 lb., 92 lb. What is the average weight per boy?

11. Matthew's savings for the past six weeks are: $.18, $.24, $.20, $.26, $.32, $.30. What are his average weekly savings?

12. Michael worked after school each afternoon last week. His earnings were $.60, $.90, $.70, $.85, and $.95. What were his average daily earnings?

13. Our school cafeteria used the following amounts of milk during 5 school days: Monday, 43 pints; Tuesday, 49 pints; Wednesday, 42 pints; Thursday, 51 pints; Friday, 50 pints. What was the average daily number of pints used?

14. Divide the sum of $\frac{1}{2}$, $\frac{1}{4}$, and $\frac{1}{8}$ by 3.

More Two-Step Problems

1. Nancy had 100 feet of fancy paper. She used 28 feet for decorating the play room, and cut the remainder into pieces $2\frac{1}{4}$ feet long. How many pieces had she?

2. For the Christmas Party, Joan packed $22\frac{1}{2}$ pounds of candy into 36 boxes of equal size. How much less than a pound did each box hold?

3. The boys had 40 pounds of hard candy. They put aside $2\frac{1}{2}$ pounds and packed the remainder into boxes. If each box held $1\frac{1}{4}$ pounds, how many boxes did they fill?

4. Fred's arithmetic marks for this week are 80, 84, 82, 90, 94. What is his daily average in arithmetic?

5. How much less than $5.00 is the cost ot 7 dozen eggs at $.60 a dozen?

6. Yesterday 8 quarts of milk were left at the school. 2 of these were put aside, and the remainder poured into glasses for the children. If each glass held $\frac{1}{4}$ qt. How many glasses were filled?

7. In our room there are 8 boys building a television set. Last week they spent $3.20 for materials, and another week they spent $2.62. What is each boy's share of the expenses so far?

8. Allan worked on Saturday and earned $5.00. If he paid $.75 each for 2 ties for his Dad, how much money had he left?

9. What is the total cost of a tennis racket for $4.19, and pair of shoes for $2.50, and 2 balls at $.49 each?

10. Teresa had 30 yards of ribbon. She gave 9 yards to her sister, and used the rest for making head bands for her classmates. If she used $\frac{3}{4}$ of a yard for each band, how many did she make?

12. Tim needs $20 to buy a new suit. If he works after school for 10 weeks and earns $\$2\frac{1}{2}$ a week, how much more than the price of the suit will he have earned?

11. Dominic's workshop has 4 windows. He needs $\frac{2}{3}$ of a yard of screening for each window. If he has 3 yards of screening, how much more has he than he needs?

13. At 3 pounds for 15¢, how many pounds can Ann buy for 60¢?

14. At 8 oz. for 72¢, how much will 6 oz. cost?

Measure Your Progress

1. Tom bought a model plane for $1.85 and 3 cans of paint at $.16 each. How much did he spend altogether?

2. Vincent sold 40 apples at $.05 each. With the money he bought story books at $.25 each. How many did he buy?

3. Mr. Owens cut the cheese which weighed $12\frac{1}{4}$ pounds into pieces weighing $\frac{7}{8}$ of a pound. How many pieces did he cut? How much money will he receive if he sells them at 30¢ a pound?

4. On Monday Mr. Mills sold 500 quarts of milk, on Tuesday, 495 quarts, on Wednesday 510 qt., on Thursday 490 qt., on Friday 500 qt. If the price of the milk was 23¢ per qt., how much did he receive for the milk?

5. 10 ft. 4 inches = how many inches?

6. The expense account for the Cubs for one week was: $.39 for a bulb, $.51 for wax, and $.10 for an expense note book, and $.06 for a pencil. If 6 boys were to share the expense equally, how much should each pay?

7. Tom made a trip to Boston. He paid $3.50 a day for his meals and $4 a day for his room in the hotel. What were his expenses for 15 days?

8. Last month Ann saved $25 and Leo saved $36. Their mother saved as much as Ann and Leo together? How much did the three save?

9. Helen had $20. She spent $7.50 for her Mother's birthday present and donated $3.50 to the Red Cross. How much money had she left?

10. Mother bought 25 yards of serge. She used $4\frac{3}{4}$ yd. for May's uniform and $2\frac{1}{2}$ yd. for Jane's skirt. How many yd. of material had she left?

11. Martin bought a 12-ft. piece of wire. He used $2\frac{1}{2}$ ft. to mend the fence and $\frac{1}{4}$ ft. to mend a screen. How much wire remained?

12. Mary used $1\frac{1}{6}$ yards of ribbon to wrap one package, and $2\frac{1}{8}$ yards to wrap another. How much has she left from a bolt of ribbon containing 20 yards?

13. Three girls together made 130 pieces of fudge. Patricia made 36 pieces and Alice made 48 pieces, how many did the third girl make?

14. The fifth grade pupils want to donate a chalice worth $110 to a missionary priest. The boys have saved $53, and the girls, $49. How much more do they need?

15. Mrs. Kerrigan bought 3 cans of cherries at 15¢ a can and a box of cookies for 35¢. How much money did she spend?

16. Father Belz paid $2.98 a gallon for 5 gal. of wax for the school floors. How much less than $20 did he spend?

17. Mrs. Craig paid $35 for a kitchen table and $8.75 each for 6 chairs. Find the total cost of her kitchen set.

UNIT 6 Test

Write the answers on your test paper:

Part I

1. Paul paid $.15 each for 4 packages of flower seeds. How much less than a dollar did he spend?

2. Ray had 28 Canadian stamps, 30 South American stamps, and 14 Vatican City stamps. These he shared with his two brothers. How many stamps did each boy receive?

3. A dealer bought 30 rugs at $150 each, and sold them at $190 each. What did he gain?

4. A merchant has 165 melons for sale. He packs them in crates, 15 melons in each, and sells them for $1.20 a crate. How much does he receive for them?

5. A trapper sold 40 muskrat skins and 25 beaver skins. If he received $10.50 a skin, what was the total amount of the sale?

6. Mr. Ross owns a farm of 160 acres. Mr. Noone owns one of 180 acres. Mr. Potter's farm is 50 acres more than the sum of the other two farms. How many acres does Mr. Potter own?

7. Jane has 96¢. She has 8 times as much money as Ellen. Betty has 10¢ more than Ellen. How much money has Betty?

8. Grace has 15¢. Patricia has 5 times as much as Grace. Rosemary has 10¢ less than Patricia. How much has Rosemary?

9. Kathleen has $3 to spend on Easter Gifts. Her gifts cost the following amounts: $.62, $.58, $.55, $.60, $.62. Did Kathleen have any money left and how much?

10. Nancy has an album for Holy Childhood Stamps. Each stamp is 10¢. If there are 10 stamps on each page, how much will Nancy have paid when she has 5 pages of stamps?

Part II

1. Harry lives $\frac{1}{3}$ of a mile from school. During each school week he walks this distance 10 times. How many miles will he walk in 6 weeks?

2. Helen made 4 curtains for her room. For each curtain she used $2\frac{1}{4}$ yards of material. If the material cost $.60 a yard, how much did the four curtains cost?

3. Joe bought a baby chicken for $.35, and $\frac{3}{4}$ of a pound of chicken feed at 12¢ a pound. How much money did he spend?

4. Tom spent $\frac{3}{8}$ of his money on a new camera and gave $\frac{1}{4}$ of his money to the missions. What fractional part of his money remained?

5. Jack spent $1\frac{1}{2}$ hours skating and $1\frac{3}{4}$ hours sledding. How much less than 4 hours is this?

6. Mother bought 4 chickens. One was $4\frac{7}{8}$ pounds, the second was $4\frac{1}{2}$ pounds, the third was $5\frac{1}{2}$ pounds, and the fourth was $5\frac{1}{8}$ pounds. What was their average weight?

7. Add $2\frac{2}{3}$ and $\frac{5}{6}$. Multiply the sum by 8.

8. John rode his bicycle $2\frac{2}{3}$ miles on Mon., $3\frac{1}{2}$ miles on Tues., $2\frac{5}{6}$ miles on Wed., $2\frac{3}{4}$ miles on Thurs., and $3\frac{1}{4}$ miles on Fri. What was the average mileage each day?

9. A tailor bought $3\frac{1}{8}$ yd. of cloth for a suit and $\frac{7}{8}$ of a yard more for an extra pair of trousers. What did the cloth cost at \$4.75 a yard?

10. If Bob spent $\frac{1}{3}$ of his money for marbles and $\frac{1}{2}$ of his money for candy, what fractional part of his money remained?

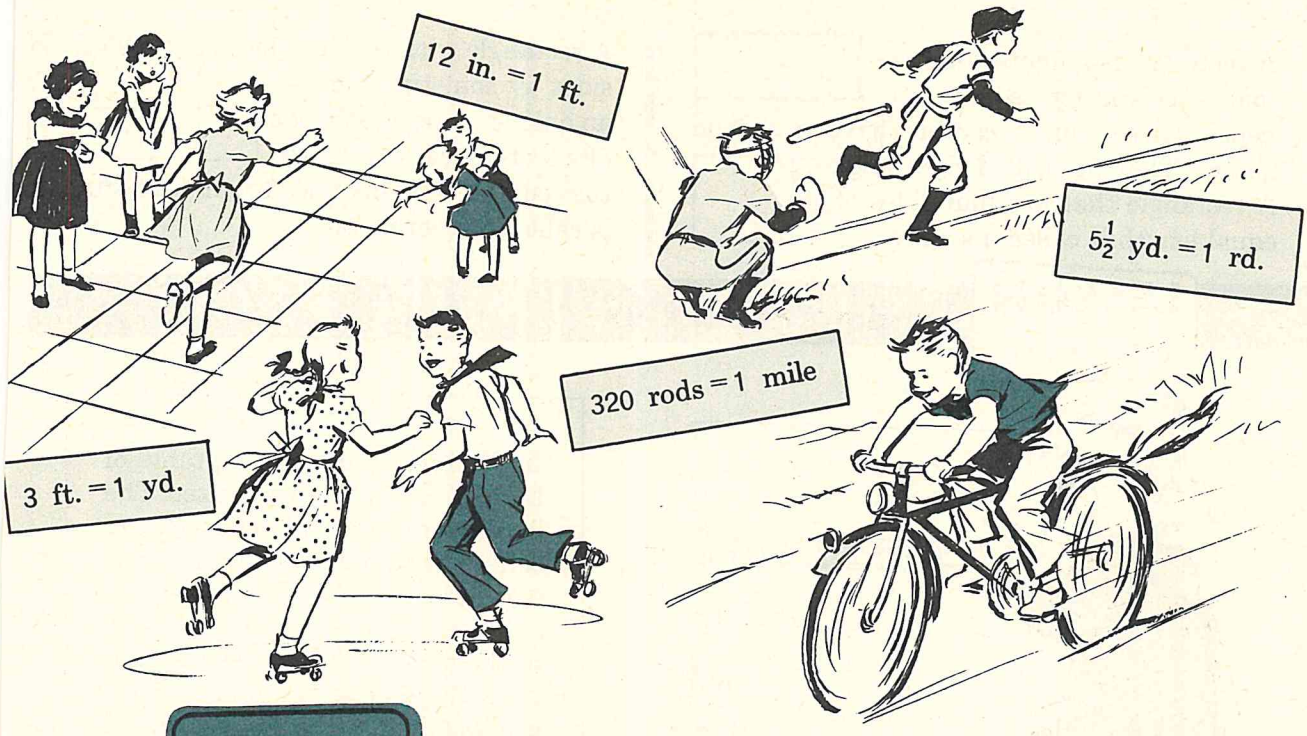
Measure Your Progress

Part I

1. How many $\frac{1}{8}$'s are there in 4?
2. How many $\frac{3}{8}$'s are there in 6?
3. How many $1\frac{3}{4}$'s are there in 14?
4. What is $\frac{3}{4}$ of 144?
5. What is $1\frac{3}{4}$ of 144?
6. How much less than $7\frac{1}{5}$ feet are $5\frac{3}{4}$ feet?
7. What is the sum of $6\frac{5}{12}$ and $5\frac{4}{9}$?
8. What is the product of $4\frac{1}{5}$ and $1\frac{1}{14}$?
9. What is the quotient when you divide $6\frac{2}{3}$ by $5\frac{5}{9}$?
10. What is the difference between $8\frac{1}{3}$ and $7\frac{3}{6}$?

Part II

1. Peter has 3 half-dollars, 4 dimes, and 3 quarters. How much money has he?
2. Mr. Jones, the baker, made 400 cupcakes. How many boxes, containing 1 dozen cakes, can he fill? What is the remainder?
3. How far will a train go in $15\frac{1}{3}$ hours at the rate of 45 m. p. h.?
4. Ralph spends 90 minutes each evening on his lessons. How many hours does he spend on home assignments in 15 days?
5. Jane saved $\frac{1}{4}$ of a dollar each week for 6 weeks. Then she spent $\$1\frac{1}{4}$. How much had she left?
6. Patsy had $7\frac{1}{2}$ pounds of stuffed dates which she packed into 12 boxes of equal size. How much less than a pound did each box contain?



UNIT 7 • MEASUREMENTS

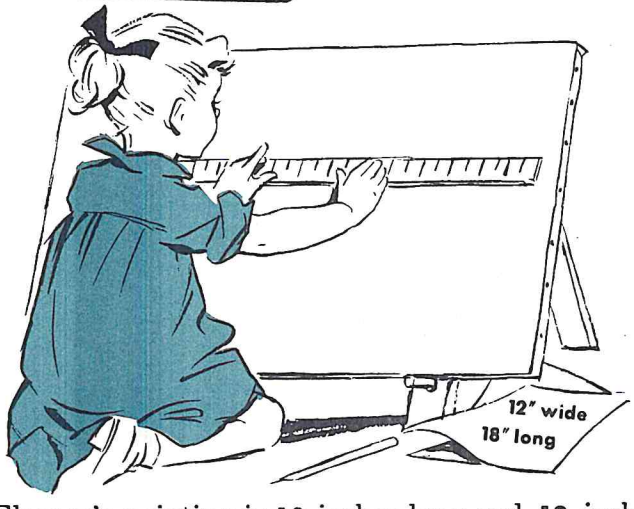
How Well Do You Remember?

1. The measure used in measuring lines is called ...(?)... measure.
2. If a line is 36 inches long, its length is ...(?)... ft. or ...(?)... yd.
3. If a room is 27 feet long, its length is ...(?)... yards long.
4. If a room is 18 feet wide, it is ...(?)... yards wide.
5. To express yards as feet, ...(?)... the number of yards by 3.
6. To express inches as yards, ...(?)... the number of inches by 36.
7. To express inches as feet, ...(?)... the number of inches by ...(?)....
8. In 1 yard, there are ...(?)... feet.
9. In 1 foot, there are ...(?)... inches.
10. Your copy book is ...(?)... inches long and ...(?)... inches wide.
11. Your desk is ..... inches long and ..... inches wide.
12. A square has ..... equal sides.
13. A square has four square .....
14. How many feet are there in 7 yd.? in 9 yd.? in 5 yd.?
15. How many yards are there in 6 feet? in 15 ft.? in 18 ft.?
16. How many feet are there in 24 inches? in 36 inches?
17. How many yards are there in 4 rods? in 7 rods? in 10 rods?
18. John rode 640 rods on his bicycle. How many miles was this?
19. Ben walked three miles to school. How many rods was this?
20. Mary skated 6 rods down the stream. How many yds. was this?

A rectangle is a figure that has four sides and four square corners. These square corners have a special name. They are called right angles. A rectangle that has four sides of equal length is called a square.

A rectangle with two long sides and two short sides is sometimes called an oblong. The longer side of a rectangle is considered the length. The distance around a rectangle is called the perimeter.

LESSON 1. Finding Perimeters



In finding Perimeter the table of Long Measure is always used. The length and width of rectangles are called the dimensions. To find the perimeter of a rectangle, the length and the width must be expressed in the same unit of measure; that is, both dimensions must be expressed in inches, or in feet, or in yards.

Eleanor's painting is **18** inches long and **12** inches wide. How much frame does she need to frame it?

We can find the answer to this question by finding the distance around the picture.

The distance around any figure is equal to the sum of its sides.

18 inches $+$ **12** inches $+$ **18** inches $+$ **12** inches $=$ **60** inches

So Eleanor needs **60** inches of framing.

There is a shorter way of finding the perimeter than by adding the four sides.

Note that **2** sides are **18** inches long and **2** sides are **12** inches wide.

So Perimeter $=$ **2** times the length $+$ **2** times the width.

If $\underline{l}$ stands for the length and $\underline{w}$ for the width, the rule for finding the perimeter of a rectangle is

$$P = 2\underline{l} + 2\underline{w}$$

$$2\underline{l} = 2 \times 18 \text{ in.} = 36 \text{ in.}$$

$$2\underline{w} = 2 \times 12 \text{ in.} = 24 \text{ in.}$$

$$60 \text{ in.}$$

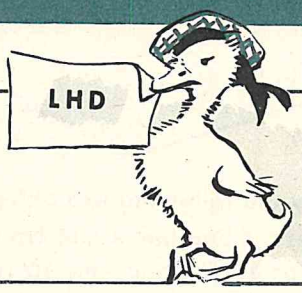
Eleanor will need **60** inches of frame.

Long Measure

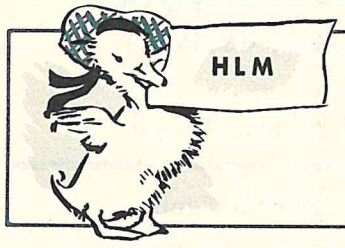
12 in. $=$ **1** ft.	$16\frac{1}{2}$ ft. $=$ **1** rd.
3 ft. $=$ **1** yd.	**320** rd. $=$ **1** mi.
$5\frac{1}{2}$ yd. $=$ **1** rd.	**5280** ft. $=$ **1** mi.
1760 yd. $=$ **1** mi.	

Inches may be represented by the double mark ″; feet by the single mark ′.

LESSON 2. Changing Measures



To change from a lower measure to a higher one, *divide*
To change inches to feet, *divide* the number of inches by **12**.
To change inches to yards, *divide* the number of inches by **36**.
To change feet to yards, *divide* the number of feet by **3**.
To change rods to miles, *divide* the number of rods by **320**.



To change from a higher measure to a lower one, *multiply*
To change feet to inches, *multiply* the number of feet by **12**.
To change yards to inches, *multiply* the number of yards by **36**.
To change yards to feet, *multiply* the number of yards by **3**.
To change miles to rods, *multiply* the number of miles by **320**.

Remember:

inches to feet, divide by **12**
inches to yards, divide by **36**
feet to yards, divide by **3**
rods to miles, divide by **320**
feet to inches, multiply by **12**
yards to inches, multiply by **36**
yards to feet, multiply by **3**
miles to rods, multiply by **320**

22 in. = (?) ft.

$12\overline{)22}$ $1\frac{10}{12} = 1\frac{5}{6}$ ft.

13 ft. = (?) yd.

$3\overline{)13}$ $4\frac{1}{3}$ yd.

5 mi. = (?) rd.

320 rd.
$\times$**5**
1600 rd.

4 yd. = (?) in.

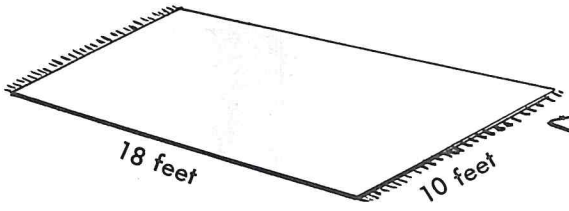
36 in.
$\times$**4**
144 in.

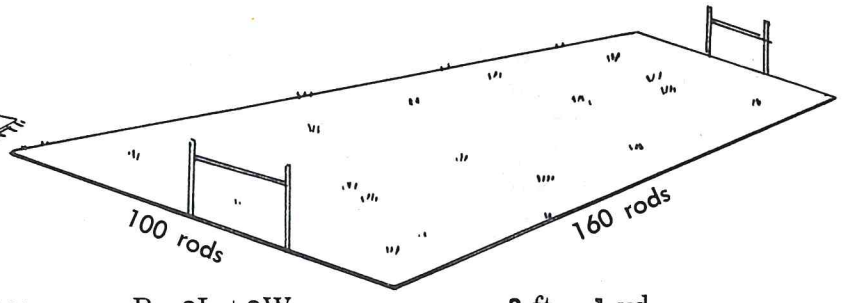
Write the missing numbers in your notebook:

1.	20 in. = (?) ft.	40 in. = (?) yd.
2.	7 ft. = (?) yd.	48 in. = (?) yd.
3.	1760 yd. = (?) mi.	54 in. = (?) yd
4.	3520 yd. = (?) mi.	10 ft. = (?) yd.
5.	42 in. = (?) yd.	21 ft. = (?) yd.
6.	108 in. = (?) yd.	29 ft. = (?) yd.
7.	640 rd. = (?) mi.	39 in. = (?) ft.
8.	480 rd. = (?) mi.	28 ft. = (?) yd.
9.	800 rd. = (?) mi.	33 ft. = (?) yd.
10.	960 rd. = (?) mi.	60 in. = (?) yd.
11.	160 rd. = (?) mi.	45 in. = (?) yd.
12.	80 rd. = (?) mi.	35 ft. = (?) yd.

Write the missing numbers in your notebook:

1.	6 ft. = (?) in.	7 yd. = (?) ft.
2.	18 ft. = (?) in.	9 ft. = (?) yd.
3.	34 yd. = (?) ft.	1760 yd. = (?) mi.
4.	1 mi. = (?) rd.	$\frac{1}{2}$ mi. = (?) yd.
5.	3 mi. = (?) rd.	5280 ft. = (?) mi.
6.	1 mi. = (?) yd.	$\frac{1}{3}$ mi. = (?) ft.
7.	2 mi. = (?) rd.	$\frac{1}{4}$ mi. = (?) yd.
8.	1 mi. = (?) ft.	$\frac{1}{4}$ mi. = (?) ft.
9.	2 mi. = (?) ft.	$\frac{1}{3}$ yd. = (?) ft.
10.	4 yd. = (?) in.	$\frac{1}{3}$ ft. = (?) in.
11.	5 ft. = (?) in.	8 yd. = (?) in.
12.	$\frac{1}{4}$ mi. = (?) rd.	$\frac{1}{8}$ mi. = (?) rd.





Study the following examples:

1. Mrs. Lane has a rug that measures **18** ft. long and **10** ft. wide. What is its perimeter in yards?

$P = 2L + 2W$
$2L = 2 \times 18$ ft. $= 36$ ft.
$2W = 2 \times 10$ ft. $= 20$ ft.
56 ft.

3 ft. $=$ **1** yd.

$56 \div 3 = 3\overline{)56}$ $\quad 18\frac{2}{3}$ yd.

Result $= 18\frac{2}{3}$ yd.

---

2. A football field is **100** rods wide and **160** rods long. If Arthur walks around it twice, how many miles does he walk?

$P = 2L + 2W$
$2L = 2 \times 160$ rd. $= 320$ rd.
$2W = 2 \times 100$ rd. $= 200$ rd.
520 rd.
distance around twice
$= 2 \times 520$ rd. $= 1040$ rd.

320 rd. $=$ **1** mile

$320\overline{)1040}$ $\quad 3\frac{1}{4}$ miles
960
80
$\frac{80}{320} = \frac{1}{4}$

Arthur will walk $3\frac{1}{4}$ miles.

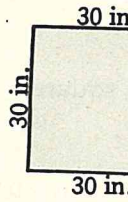
LESSON 3. Finding the Perimeter of a Rectangle

Find the perimeter of the following. Draw the figure and write the rule for each example:

	P	l	w
1.	(?) in.	15 in.	20 in.
2.	(?) yd.	15 ft.	12 ft.
3.	(?) yd.	24 ft.	20 ft.
4.	(?) ft.	20 in.	18 in.
5.	(?) yd.	48 in.	42 in.
6.	(?) ft.	16 ft.	48 in.
7.	(?) yd.	36 ft.	10 yd.
8.	(?) mi.	2 mi.	180 rd.
9.	(?) mi.	3 mi.	640 rd.
10.	(?) ft.	10 yd.	18 ft.

Solve. Draw the figure and write the rule for each problem:

1. Mother is making a quilt cover 72 inches wide and 80 in. long. Find the number of feet in the perimeter of the cover.
2. Mrs. Brady wants to fence her garden. If the garden is 4 yards long and 3 yards wide, how many yards of fencing does she need?
3. The playground is 120 feet wide and 150 feet long. How many yards are in its perimeter?
4. How many yards of tape will it take to bind a rug 27 inches wide, 36 inches long?
5. How many yards of edging will be needed to put an edge around a scarf 2 ft. wide and 5 ft. long?



How many yards of edging does Helen need to trim a square cover 30 inches on each side?

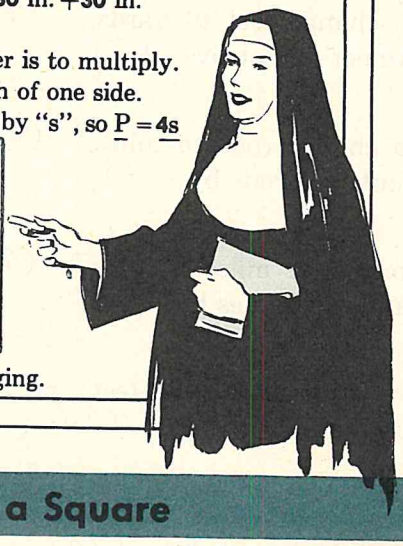
The perimeter of any figure is equal to the sum of its sides.

Perimeter of the cover = 30 in. + 30 in. + 30 in. + 30 in.
= 120 in.

A shorter way of adding the same number is to multiply.
Perimeter of a square = 4 times the length of one side.
The length of one side may be represented by "s", so $P = 4s$

$P = 4s$
$= 4 \times 30$ in.
$= 120$ in.
$3\frac{12}{36} = 3\frac{1}{3}$ yd.
$= 36\overline{)120}$
$\underline{108}$
12

Helen will need $3\frac{1}{3}$ yd. of edging.



LESSON 4. Finding the Perimeter of a Square

Find the perimeter of each of the following squares. Draw the figure and state the rule:

	P	*Length of each side*
1.	(?) yd.	24 inches
2.	(?) yd.	16 ft.
3.	(?) yd.	30 in.
4.	(?) mi.	80 rd.
5.	(?) mi.	100 rd.
6.	(?) yd.	50 in.
7.	(?) mi.	160 rd.
8.	(?) mi.	120 rd.
9.	(?) rd.	121 yd.
10.	(?) rd.	242 yd.

11. Miriam is binding a rug 81 inches square. How many yards of binding does she need? How much will it cost at $.20 a yard?

12. Philip is putting netting around a pen for his rabbits. If the pen is 72 in. square, how many yards of wire does he need? How much will it cost at $.40 a yard?

13. At $.15 a yard, what will it cost to have a tablecloth hemstitched if the tablecloth is 4 ft. on each side?

14. A pond is 30 feet square. How many yards does Tom ride on his bicycle if he makes 3 trips around the pond?

15. What is the difference between the perimeter of a rectangle 15 ft. long by 6 ft. wide and that of a square 12 feet on a side?

16. A piece of string is placed on a table in the form of a figure 15 inches square. How many feet long is the string?

Measure Your Progress

Part I

1. To change feet to yards, (?) the number of feet by (?) .

2. To change rods to miles, (?) the number of rods by (?) .

3. To change miles to rods, (?) the number of miles by (?) .

4. To change inches to feet, (?) the number of inches by (?) .

5. To change yards to inches, (?) the number of yards by (?) .

6. To change yards to feet, (?) the number of yards by (?) .

7. To change inches to yards, (?) the number of inches by (?) .

8. In 1 mile there are (?) yd.

9. In 1 mile there are (?) ft.

10. The distance around a figure is called its (?)

Part II

1. Find in yards the perimeter of an oblong 18 feet long and 16 feet wide.

2. Find in feet the perimeter of a square 3 yd. on each side.

3. An oblong is 1 mile long and 100 rods wide. Find its perimeter in rods.

4. A flower bed is 10 feet square. Find its perimeter in yards.

5. Sister's desk is 50 inches long and 1 yard wide. Find its perimeter in feet.

6. The playground of our school is 320 feet long and 240 feet wide. Find its perimeter in yards.

7. Mr. Allan's farm is 140 rods long and 120 rods wide. What is its perimeter in miles?

8. A tennis court is 78 ft. long and 12 yd. wide. If Bob walks around it three times, how many yards has he walked?

9. A lake is 1 mile wide and 640 rods long. Jack rode around it twice on his bicycle, how many miles did he ride?

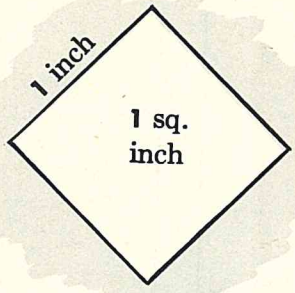
10. How much more than a mile is the perimeter of a square lot 100 rods on each side?

Part III

Match Column B with Column A.

A	B
1. (?) $2l+2w$	a. 1 yd.
2. (?) 4 s	b. rectangle
3. (?) 320 rd.	c. 4 equal sides
4. (?) 36 in.	d. 1 mile
5. (?) 3 ft.	e. P. of rectangle
6. (?) square	f. 1 yd.
7. (?) oblong	g. P. of square

LESSON 5. Area



The figure at the left is a square which measures 1 inch on each side. The flat surface covered by the square is 1 square inch. Surface is another name for area.

1. Cut a piece of cardboard 1 inch square. Draw a rectangle 3 inches by 2 inches. Place the piece of cardboard within the rectangle as shown in Figure 1. Draw a line around it.
2. Measure another square inch of surface and mark it off as shown in Figure 2.
3. Measure another square inch of surface and mark it off as shown in Figure 3.

Figure 1

1 sq. inch	

Figure 2

1 sq. inch	1 sq. inch	

Figure 3

1 sq. inch	1 sq. inch	1 sq. inch

Figure 4

2″

1 sq. inch	1 sq. inch	1 sq. inch
1 sq. inch	1 sq. inch	1 sq. inch

3″

4. Continue to measure off the squares until all the space in the rectangle is measured. Then your rectangle will be like Figure 4.
5. Count the number of square inches in the surface of the rectangle. There are 6 square inches.

6. Take another rectangle 3 inches by 4 inches. Measure it off in the same way. You will find the rectangle contains 12 square inches. The number of square inches in one row is 3. The number of rows is 4. Multiply the number of square inches in 1 row by the number of rows. 4×3 square inches = 12 square inches. Therefore, the number of units in the length times the number of units in the width equals the number of square units in the area.

4″

3″

1 sq. inch	1 sq. inch	1 sq. inch	1 sq. inch
1 sq. inch	1 sq. inch	1 sq. inch	1 sq. inch
1 sq. inch	1 sq. inch	1 sq. inch	1 sq. inch

Table of Square Measure
144 sq. in. = 1 sq. ft.
9 sq. ft. = 1 sq. yd.
$30\frac{1}{4}$ sq. yd. = 1 sq. rd.
160 sq. rd. = 1 acre
640 acres = 1 sq. mi.

7. If A stands for area, l stands for the number of units in the length, and w stands for the number of units in the width, the Rule for finding the area of a rectangle may be stated thus:

$$A = l \times w$$

LESSON 6. Finding the Area of a Rectangle

Study this example: The kitchen in David's home is **16** ft. long and **12** ft. wide. How many square yards are in the surface of the floor?

Result: $21\frac{1}{3}$ sq. yd.

$$A = L \times W$$
$$= 16 \times 12$$
$$= 192 \text{ sq. ft.}$$

9 sq. ft. = **1** sq. yd.

$$9\overline{)192} \quad 21\tfrac{1}{3} \text{ sq. yd.}$$

When finding Area be sure that both dimensions are in the same unit of measure. Both dimensions must be inches or both must be feet, or both must be yards, etc.

To change

sq. in. to sq. ft., divide by **144**

sq. ft. to sq. yd., divide by **9**

sq. yd. to sq. rd., divide by $30\frac{1}{4}$

sq. rd. to acres, divide by **160**

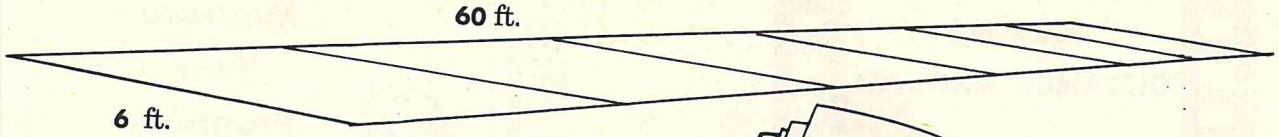
sq. rd. to sq. yd., multiply by $30\frac{1}{4}$

sq. yd. to sq. ft., multiply by **9**

sq. ft. to sq. in., multiply by **144**

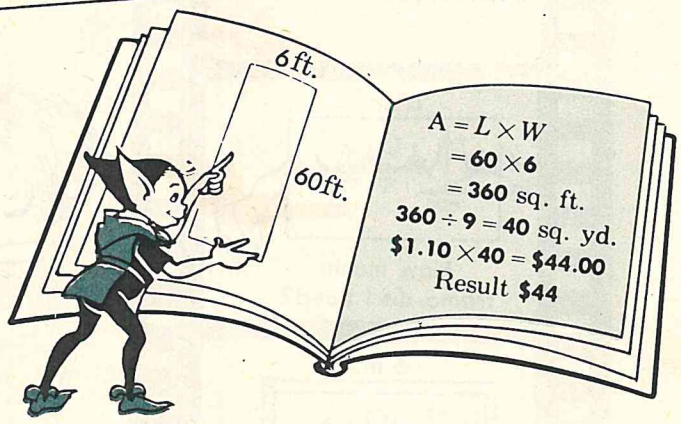
Find the Area of each of the following rectangles; draw the figure and write the rule:

	A	l	w
1.	? sq. in.	18 in.	12 in.
2.	? sq. ft.	20 ft.	18 ft.
3.	? sq. yd.	24 yd.	20 yd.
4.	? sq. ft.	40 in.	30 in.
5.	? sq. ft.	34 ft.	72 in.
6.	? sq. yd.	16 yd.	21 ft.
7.	? sq. rd.	56 rd.	45 rd.
8.	? Acres	144 rd.	20 rd.
9.	? sq. yd.	36 ft.	27 ft.
10.	? sq. yd.	6 ft.	42 in.



Find the cost of cementing a walk **60** feet long and **6** feet wide at **$1.10** a square yard.

To change square feet to square yards divide the number of square feet by **9**.



Problems in Finding Area

Solve the following problems; draw the figure, and state the rule:

1. Find the cost of covering with linoleum a kitchen floor that is 21 feet long, and 18 feet wide at $2.50 a square yard.

2. What will be the cost of a strip of carpet that measures 12 feet long and 3 feet wide, if the carpet costs $3.75 a yard?

3. Find the cost of a plot of ground 40 rods wide and 80 rods long at $60 per acre.

4. What is the total area in square yards of two bedroom floors each measuring 12 ft. by 14 ft.?

5. Which has the greater area and by how many square feet: a rectangle 30 inches by 48 inches or one that is 36 inches by 36 inches?

6. Our classroom is 24 feet by 30 feet. What will it cost to have the floor painted at $2.25 a square yard?

7. One of our blackboards is 18 feet long and 3 feet wide. What will it cost to refinish it at $1.50 a square yard?

8. How many acres are there in a field 130 rods long and 80 rods wide?

9. Teresa's garden is 27 ft. long and 18 ft. wide. Nan's garden is 30 ft. on each side. Find the difference in the areas in sq. yd.?

10. Find the number of square yards in the 4 walls of a play room if each wall is 18 ft. high and 12 ft. wide.

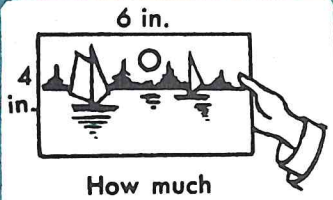
11. How many square feet of leather covering are needed for 20 cafeteria tables if each table is 9 ft. long and 30 inches wide?

12. How many square inches are there in the surface of 2 library tables each 2 ft. wide and 5 ft. long?

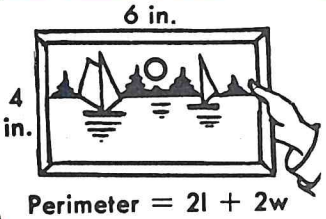
13. How many square feet of glass are needed for 3 store windows each 4 yards high and 5 yards wide?

P.146 MEASUREMENTS

PERIMETER MEANS DISTANCE AROUND



How much frame do I need?

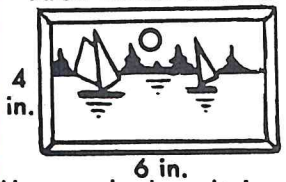


Perimeter = 2l + 2w

2 × 6 = 12 in.
2 × 4 = 8 in.
8 + 12 = 20 in.
I need 20 in. of frame.

Perimeter will always be in., ft., yd., etc.

Area means surface

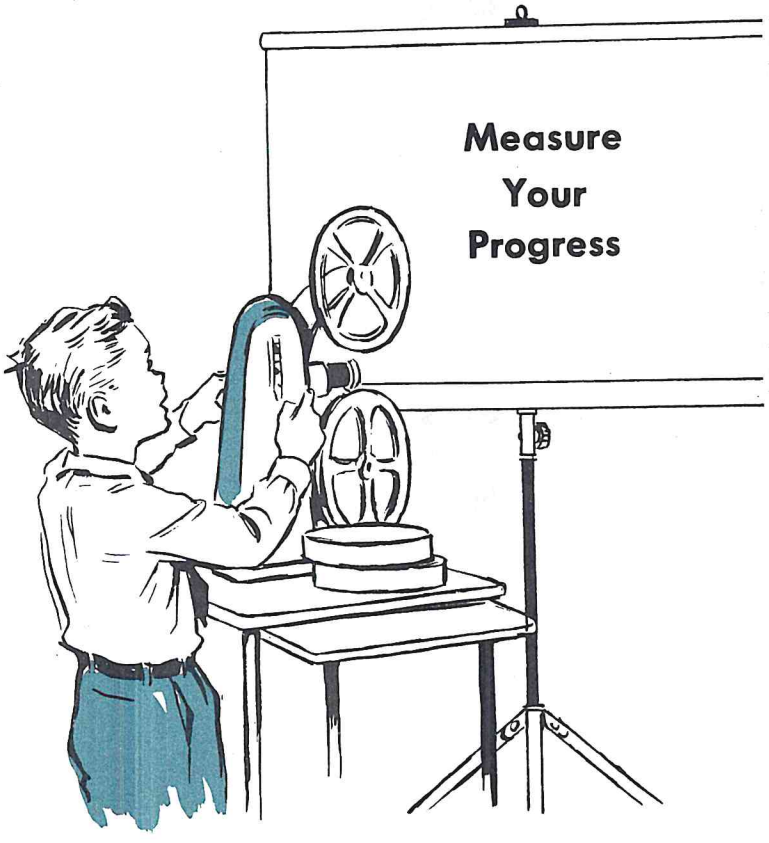


How much glass do I need?

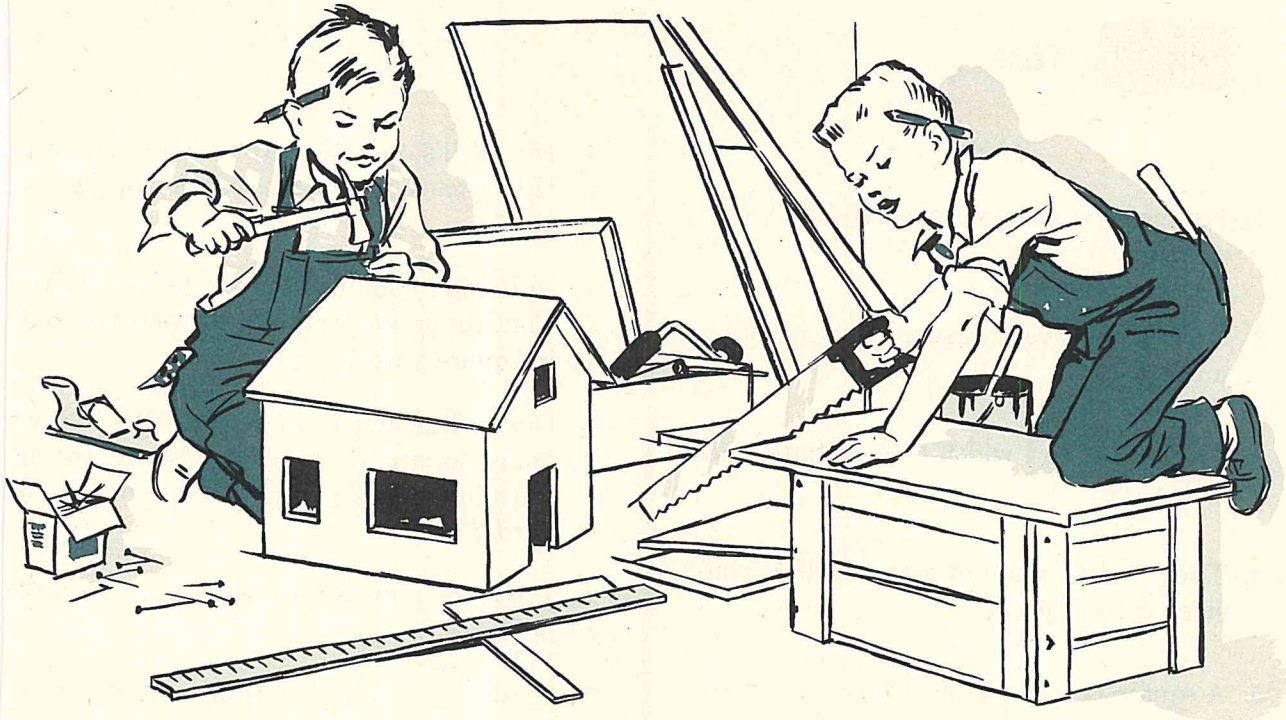
Area = l × w
= 6 × 4
= 24 sq. in.
I need 24 sq. in. of glass.

Area will always be sq. in., sq. ft., sq. yd., etc.

Measure Your Progress



1. How many feet of molding will be needed to go around a room 12 feet long and 5 feet wide?
2. Find the area in square yards of a cement walk 45 ft. long and 6 ft. wide.
3. Find how many yards of binding are needed to bind a rug 10 ft. by 7 ft.
4. Find the cost of covering a table 7 ft. long and 4 ft. wide at $.45 a square foot.
5. At $.58 a foot how much will it cost to fence a garden 6 feet on each side?
6. How many square yards in a walk 54 ft. long and 6 feet wide?
7. How many miles are there around an army camp 2 miles long and 300 rods wide?
8. A billboard along the highway is to be painted. It measures 9 ft. by 12 ft. How much will it cost at $.15 a square foot?
9. Tom's father promised to pay him $.02 a sq. ft. for mowing the lawn. If the lawn measures 15 ft. by 22 ft., how much did Tom receive?
10. Find the perimeter of a tennis court 85 ft. long and 40 feet wide.



LESSON 7. Using Fractional Dimensions

Solve:

1. Dan's tool chest is $1\frac{1}{3}$ ft. long and $\frac{3}{4}$ ft. wide. What is the area of the lid? What is the perimeter of the lid?

2. Both sides of the house that Jack is building are $2\frac{1}{2}$ feet long and $\frac{3}{4}$ ft. high. What is the area of the two sides?

3. Dan has 3 boards that he will use in making a bookcase. If each board is $1\frac{1}{3}$ inches by 24 inches, how many square inches are there in the three boards?

4. Dan wants to put 4 shelves in the bookcase. If each shelf is 6 inches by 18 inches, how many square ft. are there in the surface of the 4 shelves?

5. What is the perimeter of a table cloth $9\frac{1}{2}$ ft. long and $7\frac{1}{2}$ ft. wide? What is the area of the table cloth in square feet?

6. How many square yards of flooring are needed to cover a basement floor $20\frac{1}{2}$ ft. wide and 40 feet long? How many feet are in the perimeter of this floor?

7. A gold fish pond has a base that measures 4 ft. by $3\frac{3}{4}$ ft. What is its area in square yards?

8. The swimming pool in the new Cathedral school is 36 ft. wide and $30\frac{1}{6}$ yd. long. How many square yards of concrete have been used for the bottom of the pool?

9. A desk is $2\frac{1}{2}$ feet long and $1\frac{1}{2}$ feet wide. What is its perimeter and area?

10. A playground 81 ft. long and 75 ft. wide was set off for the children. Find its perimeter in feet and its area in square yards.

UNIT 7 Test

Part I

1. Perimeter is always measured by (?) measure.

2. Area is always measured by (?) measure.

3. The length and width of a rectangle are called the (?) .

4. The (?) side of a rectangle is considered the length.

5. A square is a rectangle of four sides.

6. The number of (?) units in the area of a figure is equal to the number of units in the (?) times the number of units in the .

7. When finding Perimeter and Area, both dimensions must be expressed in the (?) unit of measure.

8. To find how much frame is needed for a picture is to find the (?) .

9. To find how much glass is needed to cover a picture is to find the (?) .

10. To change square inches to square feet, (?) the number of square inches by (?) .

Part II

1. A rod is (?) feet in length.

2. Bill lives $\frac{1}{2}$ mile from school. How many feet is this?

3. Mr. Mill's orchard is 16 rods by 20 rods. How many acres are contained in its area?

4. A living room floor is 18 ft. by 20 ft. Find its perimeter in yards, and its area in square yards.

5. Our auditorium is 72 ft. by 40 ft. How many square yards of floor space are in the auditorium? What is its perimeter in yards?

6. Find the number of square rods in 2 acres.

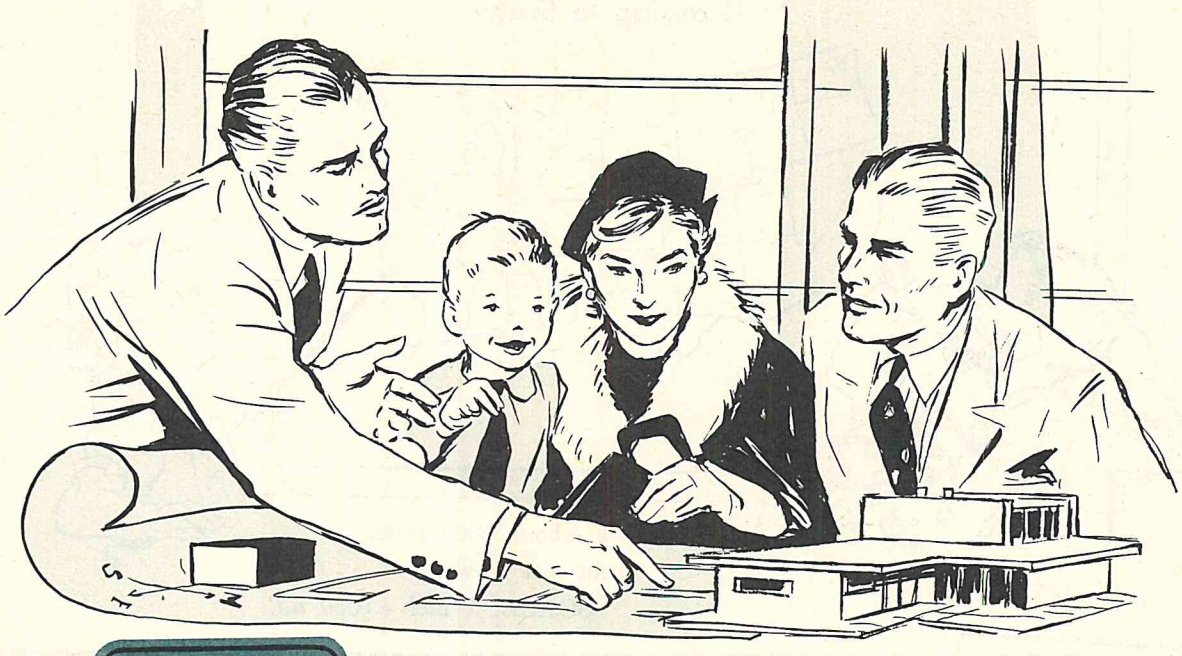
7. Find the number of square yards in 4 square rods.

8. Find the number of square rods in 242 square yards.

Part III

Match Column B with Column A.

A	B
1. (?) 9 sq. ft.	a. 1 acre
2. (?) $30\frac{1}{4}$ sq. yd.	b. A. of rectangle
3. (?) 320 rd.	c. surface
4. (?) 160 sq. rd.	d. 1 sq. yd.
5. (?) area	e. 1 mile
6. (?) $l \times w$	f. 1 sq. rod
7. (?) $2l+2w$	g. long measure
8. (?) $5\frac{1}{2}$ yd.	h. $4\frac{1}{6}$ ft.
9. (?) perimeter	i. 1 rod
10. (?) 4 ft. 2 in.	j. P. of rectangle



UNIT 8 DRAWING TO SCALE

If we know that a house is **60** ft. long, and **36** ft. wide, we cannot represent the actual size of the house on a page such as this. However, we can make a miniature drawing of the house so that the length and width will be reduced according to a definite plan.

That is if the length is reduced to $\frac{1}{12}$ of its size, the width also must be reduced to $\frac{1}{12}$ of its size. Then the length will be **5** ft. and the width, **3** ft. A drawing such as this is called a Scale Drawing.

How Well Do You Remember?

Give the answers orally.

1. Most objects are too (?) to be drawn their actual size.

2. When we make a miniature drawing of an object we are drawing to (?).

3. When drawing to scale, if we reduce the length of a rectangle to $\frac{1}{100}$ of its actual size, we must be sure to reduce the width to (?) of its actual size.

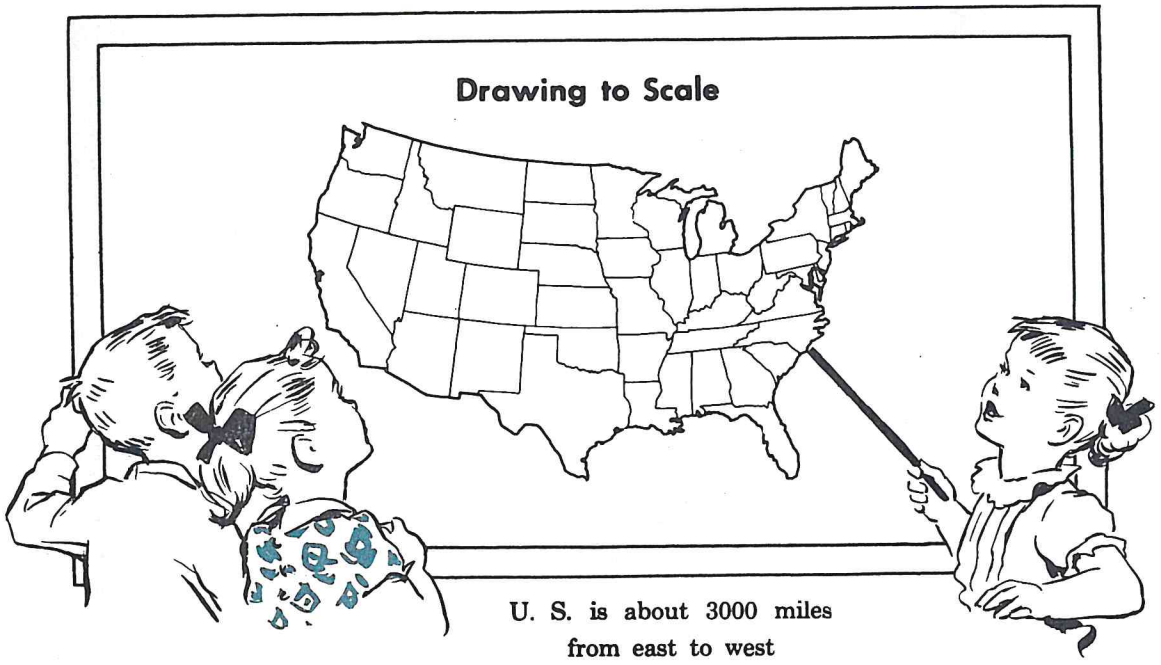
4. If a line 1 inch long is used to represent 50 feet, 4 inches will represent a line (?) feet long.

5. If a line 1 inch long is used to represent a line 100 miles long, we say the scale used is 1 inch = (?).

6. A model airplane is a miniature representation of a real (?).

7. When an architect makes a model drawing of a church or a building that he is going to build, he uses a (?) drawing.

8. When a line $\frac{1}{2}$ inch long represents 60 ft., a line 1 inch long represents (?) feet, and a line 3 inches long represents (?) feet.



LESSON 1. Scale Drawings

Elsie is studying a map of the United States. She learns the vast extent of this great country; that from San Francisco to New York there is a distance of about **3000** miles.

This distance is represented by a map only **3** inches wide. In the lower left hand corner of the page in Elsie's geography is printed *"The Scale of Miles."* From this scale she learns that **1** in. = **1000** mi. This means that every inch on the map represents **1000** miles. Therefore Elsie knows that if **1** inch represents **1000** miles, **3** inches represents **3000** miles. We say that the map is *"Drawn to Scale."*

Let an inch stand for 20 mi. How many miles will be represented by the following lines?

1. 10 in. = (?) mi. $3\frac{1}{2}$ in. = (?) mi.

2. 16 in. = (?) mi. $4\frac{1}{2}$ in. = (?) mi.

3. 18 in. = (?) mi. $2\frac{1}{2}$ in. = (?) mi.

4. 20 in. = (?) mi. $3\frac{1}{4}$ in. = (?) mi.

5. 25 in. = (?) mi. $2\frac{3}{4}$ in. = (?) mi.

6. 12 in. = (?) mi. $1\frac{3}{4}$ in. = (?) mi.

7. Use the scale 1 in. = 2 yd. Draw a line to represent 8 yd. The line will be (?) in. long.

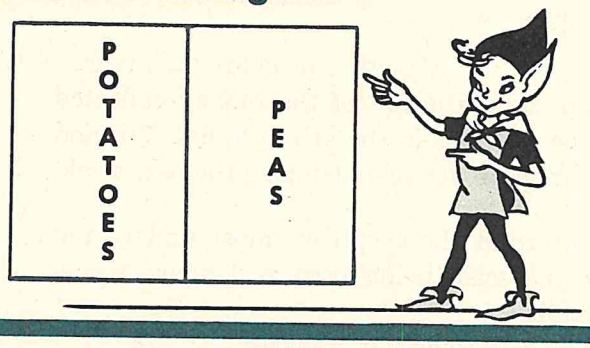
8. Use the scale $\frac{1}{2}$ in. = 4 ft. Draw a line to represent 12 ft. The line will be (?) in. long.

9. Model airplanes for the army are built on the scale 1 in. to 6 ft. This means that 1 inch in the model represents (?) ft. in the real airplane. It also means that 1 inch in the model represents (?) inches in the real airplane.

10. The distance from Tom's house to his Uncle's farm is 10 miles. If he uses the scale $\frac{1}{2}$ inch = 1 mile, how long a line will represent this distance?

Working With Scale Drawings

Mrs. Dunn has a vegetable garden that is **24** feet by **18** feet. Jane has made a scale drawing of it allowing $\frac{1}{2}$ inch to represent **6** feet.



1. How many inches long is the scale drawing?
2. That means the garden is ....(?)..... ft. long.
3. How many inches wide is the scale drawing?
4. That means that the garden is ....(?)..... ft. wide.

In the scale drawing:

5. What are the dimensions of the potato patch?
6. What are the dimensions of the potato patch in the garden?

In the scale drawing:

7. What are the dimensions of the patch of peas?
8. What are the dimensions of this same patch in the garden?
9. A rug is 9 ft. long and 12 ft. wide. Make a scale drawing of this rug using the scale 1 in. = 3 ft. The length will be ....(?)..... in. The width will be ....(?)..... in.
10. A classroom floor is 30 ft. long and 24 ft. wide. Make a scale drawing of the floor allowing 1 inch to equal 10 ft. The width will be ....(?)..... in. The length will be ....(?)..... inches.
11. A field is 20 rods long and 15 rods wide. Make a scale drawing of the field, allowing 1 inch to represent 5 rods. The width will be ....(?)..... in. The length will be ....(?)..... inches.

Figure A

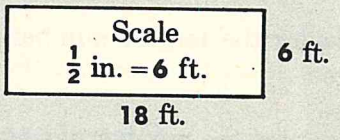
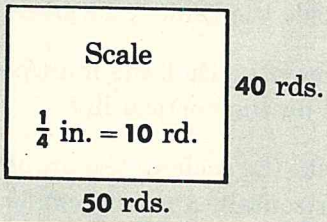


Figure B



12. Figure A is a scale drawing of the kitchen floor in Bob's home. How long is the scale drawing? Measure it and find out.

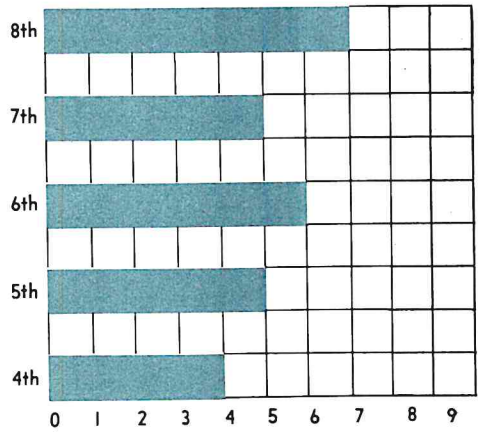
    How long is the kitchen floor?
    How wide is the kitchen floor?

13. Figure B is a scale drawing of a plot of ground.
    How long is the scale drawing?
    How long is the plot of ground?
    How wide is the scale drawing?
    How wide is the plot of ground?

LESSON 2. The Bar Graph

A picture or chart that tells facts about numbers is called a *Graph*.

Philip drew a graph of the money collected for the missions in the 4th, 5th, 6th, 7th and 8th grades of our school during the past week.



To interpret the graph we must understand that the scale being used is **1** space represents **$2.**

The 8th grade has **7** spaces **$14**
The 7th grade has **5** spaces **$10**
The 6th grade has **6** spaces **$12**
The 5th grade has **5** spaces **$10**
The 4th grade has **4** spaces ..... **$ 8**

A bar graph may be horizontal or vertical. In constructing a bar graph:

1. Consider the largest number to be represented.
2. Determine the number of spaces necessary to represent the number.
3. Decide the value to be given to each space.
4. Remember that the multiples of the scale end on the vertical line.
5. Write the scale of the graph:
   Horizontal—above or under the graph.
   Vertical—at the left of the graph.

Show each of the following in a bar graph:

1. Bill is 7 years old, Ann is 5, and Ralph is 2. (Let each space stand for 1 year.)
2. Margaret has $14 in the bank, Tom has $12, Joan has $8 and Peter has $4. (Let each space stand for $2.)
3. Richard has 21 marbles, Larry has 30, and William has 24. (Let each space stand for 3 marbles.)
4. The weights of the four children in the De Pinto family are:

   Michael 60 pounds, Marie 70 pounds, Anthony 55 pounds, and Carmelita 40 pounds. (Let each space stand for 5 pounds.)
5. During a certain period, David earned $36, Bill earned $24, Paul earned $32, and Jack earned $16. (Let each space stand for $4.)
6. Mary Ellen's arithmetic marks for the last week were: Monday 85, Tuesday 75, Wednesday 85, Thursday 100, and Friday 90. (Let each space stand for 5 points.)
7. In our school library each grade has the following number of books:

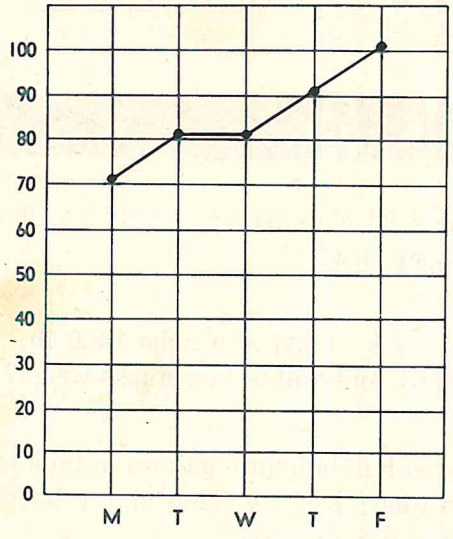
   Grade 1 —— 10 books
   Grade 2 —— 20 books
   Grade 3 —— 15 books
   Grade 4 —— 25 books
   Grade 5 —— 30 books
   Grade 6 —— 20 books
   Grade 7 —— 35 books
   Grade 8 —— 40 books

   Let each space stand for 5 books.

LESSON 3. The Line Graph

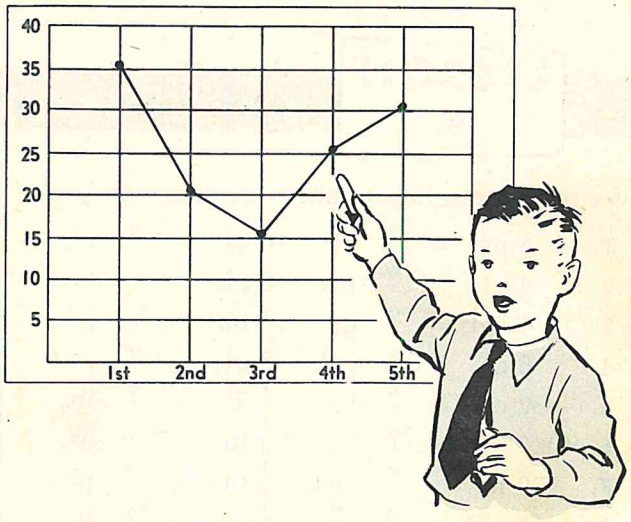
Another kind of graph is a line graph.

Joseph's marks for the week are:
Monday **70**, Tuesday **80**, Wednesday **80**, Thursday **90**, Friday **100**.



The lines across represent the spelling marks **10** to **100** in multiples of **10**. Each line up and down represents one day. The mark for each day is shown by a dot where the line for that day crosses the line that represents his mark for that day. After the dot for each day has been placed join the dots by lines.

During the last **5** weeks, Matthew saved the following amounts of money:
1st week **35¢**, 2nd week **20¢**, 3rd week **15c**, 4th week **25¢**, 5th week **30¢**.



The lines across represent the amount of money **5¢** to **40¢** in multiples of **5**.
Each up and down line represents a week. The savings for each week is shown by a dot where the line for that week crosses the line that represents Matthew's savings for that week.

Show the following in a line graph:

1. During the Red Cross Drive in our school, the following amounts were collected: 8th grade $16, 7th grade $18, 6th grade $12, 5th grade $16. (Let lines across be in multiples of 2.)

2. On a certain day last week, Jean read the thermometer outside her window each hour to see how the temperature changed. These are some of her recordings: 9 A.M. 30°, 10 A.M. 32°, 11 A.M. 36°, 12 A.M. 42°, 1 P.M. 42°. (Number lines across from 28 to 44 in multiples of 2.)

3. In the fifth grade the class median for mental each day last week was: Monday 70, Tuesday 80, Wednesday 70, Thursday 85, Friday 90. (Number lines across from 65 to 95 in multiples of 5.)

Liquid Measure	Dry Measure	Measures of Weight	Abbreviations	
2 pt. = **1** qt.	**2** pt. = **1** qt.	**16** oz. = **1** lb.	pt. = pint	oz. = ounce
	8 qt. = **1** pk.	**100** lb. = **1** cwt.	qt. = quart	lb. = pound
4 qt. = **1** gal.	**4** pk. = **1** bu.	**20** cwt. = **1** Ton	pk. = peck	cwt. = **100** weight
		2000 lb. = **1** Ton	bu. = bushel	T. = ton

Remember:
- The same abbreviation is used for one or more than one.
- To change from a lower measure to a higher one, divide.
- To change from a higher measure to a lower one, multiply.

LHD
HLM

LESSON 4. Measures

Write the missing numbers in your notebook:

1.	6 pt.	= ?	qt.	16 qt.	= ?	pk.
2.	4 qt.	= ?	pt.	8 pk.	= ?	bu.
3.	4 gal.	= ?	qt.	4 bu.	= ?	pk.
4.	8 qt.	= ?	gal.	8 qt.	= ?	pt.
5.	32 oz.	= ?	lb.	$\frac{1}{2}$ T.	= ?	lb.
6.	4000 lb.	= ?	T.	$\frac{1}{4}$ lb.	= ?	oz.
7.	500 lb.	= ?	cwt.	$\frac{1}{8}$ bu.	= ?	pk.
8.	10 cwt.	= ?	lb.	$\frac{1}{4}$ cwt.	= ?	lb.
9.	6 lb.	= ?	oz.	$\frac{1}{2}$ qt.	= ?	pt.
10.	4 T.	= ?	cwt.	$\frac{1}{8}$ pk.	= ?	qt.

Solve the following problems:

1. How much less than a ton are 8 hundredweight?
2. How much more than 2 pounds are 40 ounces?
3. How much less than 3 gal. are 10 quarts?
4. Which is greater and by how much, 2 lb. 4 oz. or 30 ounces?
5. How many pecks in 3 bu. 2 pk.?
6. How many 1-peck bags can be filled from 10 bushels of potatoes?
7. At \$.90 a quart what will 5 gallons of honey cost?
8. A stack of paper weighs 1400 lb. How many tons will 5 such stacks weigh?
9. Mrs. Hill bought 4 gallons of milk served in quart bottles. How many bottles of milk did she have?
10. How many 1-quart bags can be filled from 4 pecks of cherries?
11. Joan bought 8 ounces of candy. If the candy cost 60¢ a pound, what did Joan have to pay?
12. To change 10 bushels to pecks, (?) 10 by (?).
13. To change 10 pecks to bushels, (?) 10 by (?).
14. To change 12 ounces to pounds, (?) 12 by (?).
15. In 18 ounces, there are (?) pounds

Review of Measures

Time
60 sec. = **1** min.
60 min. = **1** hr.
24 hr. = **1** day
7 da. = **1** wk.
52 wk. = **1** yr.
12 mo. = **1** yr.
365 da. = **1** yr.
366 da. = **1** leap yr.

A leap year occurs every **4** years. Years exactly divisible by **4** are leap years, e.g. 1952.

30 days have September
April, June and November.
All the rest have **31**
Except February with **28** and no more
'Til leap year comes, then it has one more.

Noon is **12** o'clock in the day.
Midnight is **12** o'clock in the night.
A.M. is before noon.
P.M. is after noon.

Write the missing numbers in your notebook.

1. 1 hr. = ? min. $\frac{1}{2}$ hr. = ? min.

2. 120 min. = ? hr. $\frac{3}{4}$ hr. = ? min.

3. 2 wk. = ? da. $\frac{1}{3}$ min. = ? sec.

4. 72 hr. = ? da. $\frac{1}{24}$ da. = ? hr.

5. 35 da. = ? wk. $\frac{1}{7}$ wk. = ? da.

6. 120 sec. = ? min. $\frac{1}{12}$ yr. = ? mo.

7. 4 min. = ? sec. $\frac{5}{6}$ min. = ? sec.

8. 3 hr. = ? min. $\frac{3}{8}$ da. = ? hr.

9. 2 yr. = ? mo. $\frac{1}{60}$ min. = ? sec.

10. 2 da. = ? hr. 6 mo. = ? yr.

11. 1 leap yr. = ? da. 12 hr. = ? da.

12. 20 mo. = ? yr. 30 min. = ? hr.

13. Find the total number of days in March April and May.

14. Find the total number of days in September, October, November and December.

15. How many hours are there
from 11 A.M. to 1 P.M.?
from 10 A.M. to Noon?
from 10 A.M. to 2 P.M.?
from 9 A.M. to 1 P.M.?
from 8 A.M. to 2 P.M.?

16. It is now 9:50 A.M. What time will it be in: 10 min.? in 15 min.? in 20 min.?

Give the answers orally:

1. 1 dollar is worth 3 quarters (?) dimes and 3 nickels.

2. 1 dollar is worth 2 quarters, 2 dimes and (?) nickels.

3. 1 dollar is worth 1 quarter, (?) dimes, and 3 nickels.

How many cents in:

4. $\frac{1}{4}$ of a dollar $\frac{1}{10}$ of a dollar

5. $\frac{1}{5}$ of a dollar $\frac{1}{20}$ of a dollar

6. $\frac{1}{2}$ of a dollar $\frac{1}{50}$ of a dollar

Test Your Progress

Part I

1. If a truck weighs 4 tons, how many pounds does it weigh? .....
2. Which is greater and by how much, 2 bu. or 7 pecks? .....
3. Tom bought $\frac{3}{4}$ of a pound of peanuts and $\frac{2}{3}$ of a dozen of oranges. How many ounces of peanuts, and how many oranges did Tom buy? .....
4. Mary saved 2 quarters, 2 dimes, 2 nickels and 2 cents. Clare saved 3 quarters, 1 dime, and 3 nickels. Who saved more, Clare or Mary, and how much?
5. How many quarts in 4 pecks? .....

Part II

Match Column 2 with Column 1

1.	(?) $\frac{1}{2}$ T.	a.	6 oz.
2.	(?) $\frac{1}{2}$ bu.	b.	18 hr.
3.	(?) $\frac{3}{8}$ lb.	c.	12 oz.
4.	(?) $\frac{1}{4}$ pk.	d.	10 cwt.
5.	(?) $\frac{3}{4}$ da.	e.	8 mo.
6.	(?) $\frac{3}{4}$ hr.	f.	2 pk.
7.	(?) $\frac{2}{7}$ wk.	g.	2 qt.
8.	(?) $\frac{3}{4}$ lb.	h.	Scale
9.	(?) $\frac{2}{3}$ yr.	i.	45 min.
10.	(?) 1 in. = 50 yd.	j.	2 da.

UNIT 8 Test

Part I

1. A ..(?).. is a chart that gives us information about numbers at a glance.
2. You have learned about two kinds of graphs, the ..(?).. and the ..(?).. .
3. Scale drawings represent objects .. (?) than they actually are.
4. The scale on a map reads 1 inch = 150 mi. So 3 inches on the map will represent a distance of .. (?) .. miles.
5. If 1 inch represents 100 miles, how long a line will represent 500 miles?

Part II

1. To change from a higher measure to a lower one, ..(?).. .
2. To change from a lower measure to a higher one, ..(?).. .
3. To change 6 bushels to pecks, 6 by ..(?).. .
4. To change 96 hours to days (?) 96 by ..(?).. .
5. To change 16 pecks to quarts 16 by ..(?).. .
6. To change 8 quarts to pints, (?) 8 by ..(?).. .
7. To change 120 seconds to minutes, 120 by ..(?).. .

UNIT 9 ● ENRICHMENT MATERIAL

Part I

Work for Quick Thinkers

At **3** for **10¢**, find the cost of **1** dozen cupcakes. In this example there is one number that refers to money and there are two numbers that refer to cupcakes. The two numbers that refer to the same thing (cupcakes) are **3** and **12**. Find the relation between these two numbers by asking: How many times **3** is **12**? The answer is found by dividing **12** by **3**. **12 ÷ 3 = 4**. So **12** is **4** times **3**.

If **3** cupcakes cost **10¢**—**12** cupcakes will cost **4** times **10¢** or **40¢**.

Result **40¢** is the cost of **1** dozen cupcakes.

LESSON 1. Relationship In Problems

In each of the following examples, select the two numbers that refer to the same thing.

1. At 2 for 5¢, what will 20 pens cost? The numbers are (?) and (?).
2. At 3 for 25¢, what will 15 books cost? The numbers are (?) and (?).
3. At 4 for 15¢, what will 16 lemons cost? The numbers are (?) and (?).
4. At 5 for 12¢, what will 20 taffies cost? The numbers are (?) and (?).
5. At 6 for 25¢, what will 24 oranges cost? The numbers are (?) and (?).
6. At 3 for 25¢, what will 9 grapefruit cost? The numbers are (?) and (?).
7. At 2 for 25¢, what will 2 dozen cups cost? The numbers are (?) and (?).
8. At 3 for 25¢, what will 2 dozen books cost? The numbers are (?) and (?).

There are three steps to remember:

1. *Select* the **2** numbers that refer to the same thing.
2. *Divide* the larger of two numbers by the smaller.
3. *Multiply* the cost given in the problem by the quotient obtained.

Solve the following:

1. At 4 for 10¢, what will 2 doz. apples cost?
2. At 6 for 25¢, what will 1 doz. marbles cost?
3. At 3 for 10¢, what will 15 tarts cost?
4. At 2 for $.49, what will 6 ties cost?
5. At 3 for $.29, what will 1 doz. balls cost?
6. At 4 for 30¢, what will 20 books cost?
7. At 2 for 15¢, what will 40 pencils cost?
8. At 2 for $.89, what will 10 towels cost?
9. If Sue paid $.35 for 4 ounces of tea, what will she pay for 1 pound?

More Relationship Problems

Study this example:

At **3** for **$.25**, how many writing pads can I buy for **$1.50**?

Step 1—Select numbers that refer to same thing. In this example
3 refers to pencils
$.25 and **$1.50** refer to money

Step 2—Divide to find
How many times **$.25** is **$1.50**?

$$\$1.50 \div \$.25 = 25\overline{)150}^{\,6}$$

Step 3—Multiply
If **$.25** will buy **3** pencils
$1.50 will buy **6**×**3** pencils or **18** pencils.
Result **$1.50** will buy **18** pencils.

Another way of expressing relationship is by finding what part one number is of another.

What part of **6** is **3**?

This means: How is **3** related to **6**?
We find the answer by dividing **3** by **6**, as $\frac{3}{6}=\frac{1}{2}$. This shows that **3** is $\frac{1}{2}$ of **6**.

In finding what part one number is of another, we must
Express the numbers as a fraction making the number following "*of*" the denominator of the fraction.

What part of 12 is 4? *of* $\frac{4}{12}=\frac{1}{3}$

Solve:

1. At 6 for 25¢, how many taffies can Joan buy for 75¢?
2. At 3 for 10¢, how many marbles can Bill buy for 50¢?
3. At 4 for $.25, how many oranges can Mother buy for $1.25?
4. At 4 for 15¢, how many lemons can Mother buy for 90¢?
5. At 4 for $.25, how many amusement tickets can George buy for $1.50?
6. At 2 for $.29, how many electric light bulbs can Barbara buy for $1.45?
7. At 2 for $.49, how many toothbrushes can Elsie buy for $2.45?

What part of 1 lb. is 6 oz.?

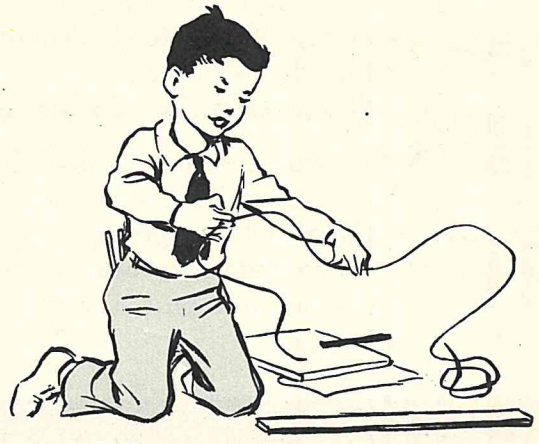
$\frac{\text{6 oz.}}{\text{of 1 lb.}}=\frac{\text{6 oz.}}{\text{16 oz.}}=\frac{3}{8}$

What part

1. of 20 is 4?
2. of 40 is 8?
3. of 10 is 5?
4. of 30 is 10?
5. of 24 is 6?
6. of 25 is 5?
7. of 45 is 5?
8. of 18 is 9?
9. of 27 is 3?
10. of 30 is 3?
11. of 16 is 4?
12. of 60 is 12?

What part

1. of 1 wk. is 1 da.?
2. of 1 ft. is 3 in.?
3. of 1 yd. is 2 ft.?
4. of 1 hr. is 6 min.?
5. of 1 yr. is 4 mo.?
6. of 1 qt. is 1 pt.?
7. of 1 gal. is 2 qt.?
8. of 1 bu. is 2 pk.?
9. of 1 mo. is 2 wk.?
10. of 1 da. is 8 hr.?



Bob has a piece of wire **26** inches long. He wants to divide it into **8** pieces of equal length. How long will each piece be?

$$8\overline{)26} \quad 3\tfrac{2}{8} = 3\tfrac{1}{4} \text{ in.}$$

Each piece will be $3\frac{1}{4}$ inches long.
In this problem the remainder may be expressed as a fraction, because each piece of wire can be $3\frac{1}{4}$ in. long.

Apples are **4¢** each. How many can Mary buy with **35¢**?

$$\$.04\overline{)\$.35} \quad 4\overline{)35} \quad \text{8 apples and 3¢ remaining}$$

Mary can buy **8** apples and she will have **3** cents left. The answer is **8** apples, R. **3¢**. In this problem, the remainder may not be expressed as a fraction, because Mary cannot buy $8\frac{3}{4}$ apples.

LESSON 2. When to Express a Remainder as a Fraction

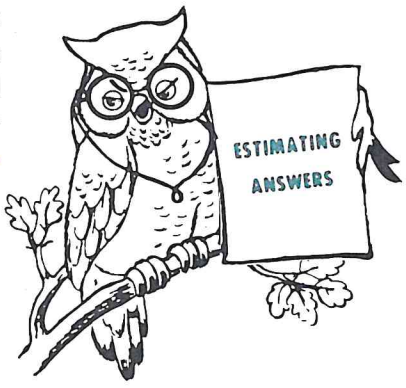
Solve the following and express the remainder correctly:

1. At \$1.50 each, how many geography books can be bought for \$8.25?
   (Express **\$1.50** as **150¢** and **\$8.25** as **825¢**.

   $$150\overline{)825} \quad \text{5 books and 75¢ remaining,}$$

2. Chickens are being sold at \$3.50 each. How many can be bought for \$10.75?
3. How many ties at \$1.50 each can be bought for \$7.50?
4. If a pilot is averaging 300 m.p.h., how long will it take him to fly 1350 miles?
5. At \$10.75 each, how many dresses can be bought for \$43.50?
6. At \$12.50 each, how many coats can be bought for \$40.00?
7. At \$1.20 per week, how long will it take to save \$15.00?
8. A dealer is buying shoes at \$6.75 a pair. How many pairs can he buy for \$50?
9. Tom's father works for \$2.30 an hour. How many hours must he work to earn \$12.65?
10. At \$2.40 a yard, how many yards of material can be bought for \$12.60?
11. A dealer bought boys' overcoats for \$10.65 each. How many did he buy if his bill including delivery charges of \$1.20 was \$86.40?
12. Father Ford has \$97 to spend for new desks. If the desks are listed at \$10.75 each, how many can he buy?

Make sure your answer to a problem is a sensible one. It is always wise to look ahead and consider *about* what your answer should be. This is called "*Estimating Answers.*"



How accurate are your estimates? Estimate the length of this line in inches.

Measure the line with your ruler. Compare the estimation with the actual measurement. What is the difference between your estimation and the actual length?

LESSON 3. Estimating Answers

In each of the following write your estimation, and then work the problem. Compare your estimation with the answer you obtained:

1. What is $\frac{1}{3}$ of \$9.85?
   Think: **\$9.85** is close to **\$10.00.**
   $\frac{1}{3}$ of **\$10** is **\$3**$\frac{1}{3}$ or about **\$3.30.**

2. What is $\frac{1}{5}$ of \$11?
   (A little more than **\$2.00.**)

3. Mary wants to make a dress. She has two pieces of material. One piece is $1\frac{1}{3}$ yd., the other is $1\frac{2}{3}$ yd. The pattern calls for $3\frac{4}{9}$ yards. How much more material does Mary need?

4. A boy worked 2 hours on Monday, $1\frac{1}{4}$ hours on Tuesday, $1\frac{3}{4}$ hours on Wednesday, $2\frac{1}{2}$ hours on Thursday, and $3\frac{1}{4}$ hours on Friday. How many hours did he work in the five days?

5. What is the cost of $\frac{3}{4}$ of a pound of meat at \$.54 a pound?

6. Philip's brother earned $\$16\frac{1}{2}$ in 3 days. How much does that average a day?

Estimate first and then check by actual measurement:

1. What is the length of your arithmetic book?

2. What is the width of your arithmetic book?

3. How long is your desk?

4. How wide is your desk?

5. How many feet long is the blackboard?

6. How many feet wide is your classroom?

7. How many yards long is your classroom?

8. How many inches wide are the windows in your room?

Estimate and when you have found the answer, compare the two.

9. Estimate the perimeter of a map 33 inches long and 18 inches wide.

10. Estimate the area of a lot 18 feet wide and 23 feet long.

Common fractions having a denominator of **10**, or multiples of **10**, as **100**, **1000**, can be expressed as decimal fractions.

$\frac{4}{10} = .4$ each is read **4** tenths
$\frac{1}{10} = .1$ each is read **1** tenth
$\frac{7}{10} = .7$ each is read **7** tenths
$\frac{3}{10} = .3$ each is read **3** tenths

The first place to the right of the decimal point is called *tenths*.

$\frac{9}{100} = .09$ each is read **9** hundredths
$\frac{19}{100} = .19$ each is read **19** hundredths
$\frac{5}{100} = .05$ each is read **5** hundredths
$\frac{15}{100} = .15$ each is read **15** hundredths
$\frac{4}{100} = .04$ each is read **4** hundredths
$\frac{75}{100} = .75$ each is read **75** hundredths

The second place to the right of the decimal point is called *hundredths*.

Mixed Numbers and Mixed Decimals

$4\frac{7}{10} = 4.7$ each is read **4** and **7** tenths
$3\frac{9}{100} = 3.09$ each is read **3** and **9** hundredths

LESSON 4. Learning About Decimals

Read the following:

1.	.2	.7	.5	.6	.8	.9
2.	.04	.03	.09	.02	.01	.06
3.	.75	.32	.18	.24	.45	.97
4.	4.3	5.7	8.9	9.8	6.5	3.9
5.	9.35	6.04	7.03	8.02	5.92	2.36

Write in figures:

1.	seven tenths	seven hundredths
2.	nine tenths	nine hundredths
3.	eight tenths	eight hundredths
4.	one tenth	one hundredth
5.	six tenths	six hundredths

Write in figures:

1. seventy-five hundredths
2. ninety-one hundredths
3. sixty-three hundredths
4. eighty-six hundredths
5. twenty-six hundredths
6. six and four hundredths
7. five and three hundredths
8. nine and four hundredths
9. eight and twelve hundredths
10. six and eleven hundredths

Decimals are added and subtracted just as you have added and subtracted dollars and cents.

Add **$4.06**, **$.95**, and **$1.35**

$$\begin{array}{r} \$4.06 \\ .95 \\ 1.35 \\ \hline \$6.36 \end{array}$$

Remember to place
decimal point under decimal point,
tenths under tenths,
hundredths under hundredths,
decimal point in the answer under the other decimal points,
units under units.

LESSON 5. Adding and Subtracting Decimals

Add:

1.	4.6	2.3	9.1
	3.2	6.2	5.4
	5.8	8.6	3.8
2.	2.08	6.97	5.14
	6.04	2.18	6.32
	7.18	4.27	5.78
3.	6.72	2.79	.45
	.05	1.16	3.27
	1.64	.75	6.82
4.	9.16	8.19	.75
	.45	1.64	.64
	2.16	.78	1.78

Subtract:

5.	4.12	9.74	8.04
	3.44	.69	.92
6.	7.08	8.92	4.73
	.95	2.09	1.97
7.	5.34	2.00	6.79
	2.98	.28	4.98
8.	8.00	9.63	4.90
	.75	3.85	2.98

Arrange in columns and add:

1.	2.04,	6.72,	8.59,	4.76,
2.	5.19,	4.36,	2.19,	8.62,
3.	8.29,	6.04,	9.04,	8.06,
4.	5.06,	.75,	.06,	1.95,
5.	2.09,	1.76,	.35,	.78,
6.	.54,	4.63,	.18,	2.75,
7.	4.25,	.09,	.07,	8.65,

Arrange in columns and subtract:

8. From 4.25 take 2.39

9. From 6.03 take 1.64

10. From 8.16 take 4.37

11. From 4.45 take 2.68

12. From 5.04 take .95

13. Take 3.97 from 9.87

14. Take 4.09 from 7.56

Meehan's Athletic Supplies
144 State Road
Phone: Lo-4-9876 Los Angeles, California

March 1, 1952

Sold to:

Reverend John J. Ford
Holy Angel Rectory
Los Angeles, California

Date	Items	Charges	Amount Due
Feb. 2	1 set of Billiard Balls	63.75	
	1 Billiard table	175.00	
	1 doz. Billiard Rule Books @ .40	4.80	
			243.55

LESSON 6. Bills

The Athletic Society of the Holy Angel Parish under the direction of Father Ford bought new supplies for their gymnasium. The above form is a copy of the *bill* or *statement* received from the firm where they made their purchases.

After a close study of the bill you will know the necessary information to be listed on every *bill form*. The following list includes the information which must appear on *bills*.

1. Creditor's name (one who gives the credit).
2. Debtor's name (one who makes the purchases).
3. Date (date, month and year bill is issued).
4. Items (names and numbers of articles purchased).
5. Prices (cost of each purchase).
6. Amount due (total cost of articles purchased).

Supply the missing words:

1. In this bill the debtor is (?) .
2. The creditor is (?) .
3. The amount due is (?) .
4. The date of issue is (?) .
5. The date of purchase is (?) .

Make a bill using the following information:

Creditor: Ominsky's Toy Store
763 Main Street
New York, N. Y.

Debtor: Mr. James Allen
400 Green Street
Hartford, Connecticut

Date of issue: September 1, 1951

Date of purchases: Aug. 11, 1951
Aug. 20, 1951
Aug. 26, 1951

Items: 1 doll carriage @ $9.95
1 toy gas station @ $4.98
1 toy cash register @ $2.79

Tables of Measure

Long Measure

Used in measuring lines.

12 inches	= 1 foot	in.
3 feet	= 1 yard	ft.
36 inches	= 1 yard	yd.
$5\frac{1}{2}$ yards	= 1 rod	rd.
$16\frac{1}{2}$ feet	= 1 rod	
320 rods	= 1 mile	mi.
1760 yards	= 1 mile	
5280 feet	= 1 mile	

Square Measure

Used in measuring surfaces.

144 square inches	= 1 square foot	
9 square feet	= 1 square yard	
$30\frac{1}{4}$ square yards	= 1 square rod	
160 square rods	= 1 acre	

Measures of Weight

16 ounces	= 1 pound	oz.
100 pounds	= 1 cwt.	lb.
20 cwt.	= 1 ton	cwt.
2000 pounds	= 1 ton (short)	T.
2240 pounds	= 1 ton (long)	

Measures of Counting

12 things	= 1 dozen	doz.
12 dozen	= 1 gross	gr.
144 things	= 1 gross	

Liquid Measure

2 cupfuls	= 1 pint	pt.
2 pints	= 1 quart	qt.
4 quarts	= 1 gallon	gal.

Dry Measure

2 pints	= 1 quart	qt.
8 quarts	= 1 peck	pk.
4 pecks	= 1 bushel	bu.

Measures of Time

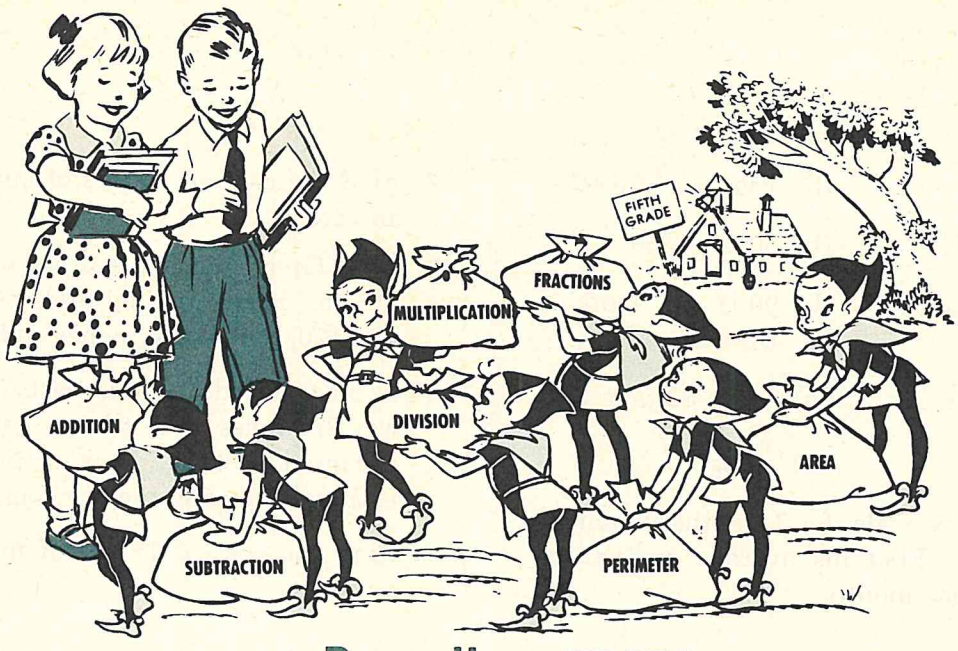
60 seconds	= 1 minute	sec.
60 minutes	= 1 hour	min.
24 hours	= 1 day	hr.
7 days	= 1 week	da.
52 weeks	= 1 year	wk.
12 months	= 1 year	mo.
365 days	= 1 year	yr.
366 days	= 1 leap year	
10 years	= 1 decade	
100 years	= 1 century	

Thirty days have September,
April, June and November.
All the rest have thirty-one,
Except February which has **28** and no more,
'Til leap year comes, then it has one more.

A leap year is one that is exactly divisible by **4**, as **1952**.

United States Money

5 cents	= 1 nickel
2 nickels	= 1 dime
10 cents	= 1 dime
10 dimes	= 1 dollar
25 cents	= 1 quarter
50 cents	= 1 half-dollar
100 cents	= 1 dollar



Part II TESTS

TEST 1

1. (a) $360-275$ (b) 306×24

2. (a) $963+479$ (b) $7\overline{)1428}$

3. (a) $\frac{1}{9}$ of 369 (b) $\frac{1}{8}$ of 1 pk = (?) qt.

4. (a) $4\overline{)39}$ (b) $7\overline{)350}$

5. (a) $8\overline{)\$3.60}$ (b) $\$.08\overline{)\$3.60}$

6. John spent 79 cents and had 15¢ left. How much money had he at first?

7. Columbus discovered America in 1492. How many years was it from then until 1776?

8. If Paul saves \$5 a month, how much money does he save in a year?

9. A dealer had 180 cans of tomatoes which he packed into cartons. If he put 12 cans in each carton, how many cartons did he use?

10. At 10¢ a quart, find the cost of 3 gallons of syrup.

TEST 2

1. (a) $26+125+9$ (b) $400-235$

2. (a) $32\overline{)4928}$ (b) 350×20

3. (a) \$3.50 + \$.75 + \$.08 (b) $6\overline{)732}$

4. (a) 3 gal. = (?) pt. (b) From \$5 take \$2.34

5. (a) $\$4.70\times50$ (b) XLVII

6. Mrs. Conway gave the clerk \$10 for groceries that cost \$6.25. How much change did she receive?

7. Four boys shared the cost of a fishing trip. If the expenses were \$8.12, what did each boy pay?

8. What is the total number of days in September, October, and November?

9. Our auditorium has 27 rows of seats with 32 seats in each row. How many seats are there altogether?

10. At 14¢ a pint, find the cost of 24 quarts of syrup.

TEST 3

1. (a) $36-27$ (b) 1 yr. = (?) weeks
2. (a) XCVII (b) $3002-1369$
3. (a) $\$7.08\times35$ (b) 90 is more than 26
4. (a) $4\overline{)2416}$ (b) From \$3 take \$.08
5. (a) $\frac{2}{3}=\frac{}{6}$ (b) $\frac{5}{7}=\frac{}{28}$
6. Mr. Quigley's sales for 3 months amounted to \$2436. Find his average amount of sales for one month.
7. Find the cost of 7 acres of land at \$905 an acre.
8. Mrs. Green bought a dress on sale for \$16.75. If the original price of the dress was \$20, how much money did she save?
9. A car traveled 575 miles last week. This was 275 miles more than it had traveled the previous week. How many miles had it traveled during the previous week?
10. Find the cost of 12 qt. of milk at 11¢ a pint.

TEST 4

1. (a) $\frac{2}{3}=$ (?) ninths (b) $3\frac{7}{8}=\frac{}{8}$
2. (a) 608×70 (b) 16 qt. = (?) pk.
3. (a) $489+350+870$ (b) $9\overline{)8253}$
4. (a) $\$8-\$4.35$ (b) $19\overline{)912}$
5. (a) 2 bu. = (?) pk. (b) $6002-3998$
6. Find the cost of 7 gallons of milk at 23¢ a quart.
7. A musical was attended by 250 adults and 120 children. If the adults paid \$.50 each and the children, \$.35 each, how much money was taken in?
8. Subtract four-tenths from nine-tenths.
9. How much less than $\frac{7}{9}$ is $\frac{4}{9}$?
10. How much would you save in buying a pound of tea for 75¢ instead of buying eight 2-oz. pkg. at 15¢ each?

TEST 5

1. (a) $\$5.80\times80$ (b) $59\overline{)5074}$
2. (a) (?) ft. = 1 mi. (b) $4444-2789$
3. (a) $\$70.01-\$12.08$ (b) $\$9.03+.85+.04$
4. (a) $1003-999$ (b) $\$29\overline{)\$667}$
5. (a) $\frac{2}{3}=\frac{}{24}$ (b) $\frac{24}{36}=\frac{}{3}$
6. Last year the population of a small town increased by 275. This brought the population to 12,240. What was the population before the increase?
7. If a gross of pencils cost \$5.76, find the cost of 1 dozen.
8. Change seven-eighths to sixteenths.
9. How many pecks are there in 4 bushels?
10. A man drove 360 miles in 8 hours. Find his average rate of speed.

TEST 6

1. (a) $700-367$ (b) 800×506
2. (a) $4\frac{1}{9}=\frac{\ }{9}$ (b) $\frac{18}{24}=\frac{\ }{4}$
3. (a) $\$43.70\div\$.95$ (b) $5034-2097$
4. (a) Take 28 from 90. (b) $8\overline{)3248}$
5. (a) 2 yd. = (?) ft. (b) 6 in. = (?) ft.
6. Find the sum of three-eighths and one-eighth.
7. How much less than \$20 is \$17.95?
8. John's brother saved \$240 in 8 months. What were his average monthly savings?
9. The St. Vincent de Paul Society prepared 72 Christmas baskets. Each basket had groceries to the amount of \$10.75. How much was spent for the 72 baskets?
10. Write 1854 in Roman numbers.

TEST 7

1. (a) $\$9.03\times200$ (b) $\$5+\$2.35+\$.08$
2. (a) (?) qt. = 2 pk. (b) $6000-1009$
3. (a) $8\overline{)2416}$ (b) CXV
4. (a) $2003-1998$ (b) From \$9 take \$.15
5. (a) $27\overline{)\$83.16}$ (b) 78 increased by 46 is (?).
6. Mr. Snyder had 204 oranges. If he sold them at \$.60 a dozen, how much did he receive for them?
7. A farmer planted 840 tomato plants. If he put 24 plants in each row, how many rows of tomato plants did he have?
8. In 1 there are (?) twelfths and in 4 there are (?) twelfths.
9. The Quigley Company has 756 employees. This is 126 fewer than the Murphy Company. How many employees has the Murphy Company?
10. From the sum of $\frac{2}{5}$ and $\frac{1}{4}$ take $\frac{3}{20}$.

TEST 8

1. (a) $948+390+75$ (b) $\$6-\$.04$
2. (a) 4 oz. = (?) lb. (b) 205×730
3. (a) $\$225.75\div\$.75$ (b) $\$7.08-\$5.99$
4. (a) $\frac{34}{9}=$? (b) $9\frac{3}{5}=\frac{\ }{5}$
5. (a) $.08\overline{)\$9.36}$ (b) $5\overline{)\$700.10}$
6. At 35 cents each, how many paint sets can be bought for \$9.45?
7. Change the number 8 to twelfths.
8. Tom has 78 marbles. This is 23 fewer than James has. How many marbles has James?
9. Change eight-sevenths to a mixed number.
10. Mary used $1\frac{1}{4}$ yd. of ribbon for her hair and $1\frac{3}{4}$ yd. for her dress. How many yards of ribbon did Mary use?

TEST 9

1. (a) 204×700 (b) $\$8.09 - \$2.90$
2. (a) $9\frac{1}{8} + 3\frac{5}{8}$ (b) Divide 1296 by 18
3. (a) $69\overline{)\$55.89}$ (b) 32 oz. = (?) lb.
4. (a) $42 + 580 + 4$ (b) $421\overline{)168400}$
5. (a) From \$9 take \$6.35 (b) $6\overline{)5230}$
6. Find the cost of 15 sweaters at \$3.75 each.
7. At \$.75 an hour, how long must John work to earn \$6.75?
8. Mary had $5\frac{3}{4}$ yards of ribbon. She used $1\frac{1}{4}$ yards. How many yards of ribbon had she left?
9. If Mr. Fay earns \$54 a week, find his yearly salary.
10. How many quart bottles can be filled from 10 pints?

TEST 10

1. (a) $\frac{3}{10} + \frac{9}{10}$ (b) $\frac{17}{20} - \frac{2}{20}$
2. (a) 908×350 (b) $\$.09 \times 86$
3. (a) $2350 \div 47$ (b) $\$20.04 - \$6.29$
4. (a) (?) yd. = 1 rod (b) $7\overline{)\$8.33}$
5. (a) $408\overline{)14688}$ (b) $6000 - 38$
6. At 40¢ a dozen, how many oranges can I buy for 20¢?
7. How many five-cent candy bars can I buy for \$1.25?
8. How much would a farmer receive for 50 gallons of milk at 20¢ a quart?
9. A dealer had 2 turkeys. One weighed $10\frac{3}{4}$ lb. and the other weighed $15\frac{1}{4}$ lb. Find the total weight of the two turkeys?
10. Mr. Kramer's profits last year amounted to \$2,000. This was \$600 less than the previous year. What were his profits the previous year?

TEST 11

1. (a) $\$50.01 - \$7.08$ (b) (?) ft. = 1 rod
2. (a) Divide 1420 by 15 (b) 700×803
3. (a) $8030 - 76$ (b) $8\overline{)222}$
4. (a) 605×902 (b) $243 + 17 + 42 + 8$
5. (a) $19\frac{5}{12} - 3\frac{1}{12}$ (b) $4\frac{4}{9} + 5\frac{7}{9}$
6. If 35 pairs of shoes cost \$173.25, find the cost of each pair.
7. Furniture that had been originally marked \$180, was being sold at a reduction of \$36. What was the selling price?
8. A dress that has been reduced \$2.50 is now selling at \$15.75. Find the original price.
9. Bill's father earned \$65.80 last week. After paying his expenses he was able to save \$12.95. What were his expenses?
10. Ray rode his bicycle $9\frac{5}{8}$ miles yesterday and $4\frac{3}{4}$ miles today. How far did he ride in the two days?

TEST 12

1. (a) 850×709 (b) $\$50 - \$9.05$

2. (a) $4\frac{11}{20} + 2\frac{7}{20} + \frac{7}{20}$ (b) $9\frac{7}{12} - 3\frac{7}{12}$

3. (a) $25928 \div 463$ (b) 340×200

4. (a) (?) rods = 1 mile (b) $3\overline{)8424}$

5. (a) $25\overline{)450}$ (b) $\$5 + \$.95 + \$.08$

6. A butcher bought one ham weighing $12\frac{1}{5}$ lb. and another ham weighing $11\frac{1}{20}$ lb. Find the difference in their weight.

7. If an arithmetic book cost \$.95, what will it cost to supply books for 48 pupils?

8. If 18,330 bushels of wheat were shipped in 39 carloads, what was the number of bushels in each car?

9. Find the cost of 5 yards of wire at 15¢ a foot.

10. At 35¢ a peck, what will 3 bushels of potatoes cost?

TEST 13

1. (a) $947 + 308 + 95$ (b) $524 - 407$

2. (a) $8\frac{3}{14} - 5\frac{1}{4}$ (b) $\frac{7}{10} + \frac{8}{15}$

3. (a) 370×830 (b) $9\overline{)27234}$

4. (a) $17\overline{)\$52.36}$ (b) $807\overline{)45192}$

5. (a) 409×605 (b) (?) rd. in $\frac{1}{4}$ mile

6. Mr. Lynch bought 35 acres of land for \$2464. Find the price of the land per acre.

7. A fur coat originally marked \$415 has been reduced to \$370. How much has it been reduced?

8. At an average speed of 39 miles per hour, how far will a car travel in 15 hrs.?

9. A farmer raised 532 bushels of potatoes. How many pecks of potatoes did he raise?

10. If Bob walks 1 mile in 20 minutes, how many feet does he walk in a minute?

TEST 14

1. (a) (?) ft. in $\frac{1}{2}$ mi. (b) $3\overline{)\$182.70}$

2. (a) 702×805 (b) $5004 - 307$

3. (a) $19\overline{)1678}$ (b) $\$50.01 - \$17.09$

4. (a) $5\frac{7}{18} - 1\frac{5}{12}$ (b) $3\frac{7}{10} + 4\frac{7}{12}$

5. (a) $24912 \div 346$ (b) 900×973

6. The librarian arranged 2040 books on the library shelves. If she put 24 books on each shelf, how many shelves did she fill?

7. A field is 150 ft. long and 140 ft. wide. How many yards are in its perimeter?

8. Alice bought $7\frac{1}{3}$ yards of material to make a dress. If she used $4\frac{5}{6}$ yd., how many yards of material had she left?

9. Bernice picked 24 quarts of berries. How many pints of berries did she pick?

10. Write in Roman numbers 1950.

TEST 15

1. (a) $\frac{1}{5}+\frac{1}{20}+\frac{1}{10}+\frac{1}{15}$ (b) $5\frac{5}{18}-2\frac{3}{4}$
2. (a) $\$40.50\times19$ (b) $\$20-\$9.05$
3. (a) (?) yd. in 1 mile (b) $840+30+78$
4. (a) $8\frac{7}{10}+9\frac{5}{16}$ (b) $6\frac{3}{10}-4\frac{7}{8}$
5. (a) $643+872+948$ (b) $68\overline{)\$73.44}$
6. Mr. Bilk's garden is 40 ft. long and 30 ft. wide. How many yards of fencing are needed to go around it?
7. The following are Mr. Johnston's sales for 4 days: \$525, \$723, \$625, \$475. Find his average sales.
8. The Boy Scouts have saved \$9.00 to buy a new camping tent. If the tent will cost \$12.95, how much money do they still need?
9. Find the cost of 15 gal. of milk at 20¢ a quart.
10. How much less than $6\frac{3}{10}$ is $4\frac{5}{8}$?

TEST 16

1. (a) $6+50+30$ (b) 30 min. = (?) hr.
2. (a) $\frac{1}{6}+\frac{1}{18}+\frac{1}{3}+\frac{2}{9}$ (b) $4\frac{3}{5}-2\frac{7}{8}$
3. (a) $\$50.07-\$3.89$ (b) 807×604
4. (a) $36\overline{)1044}$ (b) $104\overline{)\$110.24}$
5. (a) $6\frac{3}{8}=5\frac{}{8}$ (b) $3\frac{11}{9}=4\frac{}{9}$
6. A dealer sold 143 gallons of ice cream last week. This was 123 gal. less than he sold the previous week. How many gallons of ice cream did he sell the previous week?
7. One pole is $19\frac{2}{15}$ ft. long and another pole is $15\frac{11}{20}$ ft. long. How much shorter is the second than the first?
8. How many feet of tape are needed to go around the edge of a poster 15 in. long and 7 in. wide?
9. Dan works 6 days a week. He receives \$96 a month. How much does he earn in a day?
10. At 10¢ a pint, find the cost of 4 quarts of milk.

TEST 17

1. (a) $4\frac{1}{4}+4\frac{11}{12}$ (b) $1\frac{1}{6}-\frac{3}{4}$
2. (a) $3\overline{)6150}$ (b) $\$50.08\times500$
3. (a) 480×906 (b) $458+397+208$
4. (a) $\$6-\$.79$ (b) $\$2.05\overline{)\$209.10}$
5. (a) 9 ft. = (?) yd. (b) (?) min. = 1 hr.
6. Mrs. Carey paid \$7.95 for a new lamp, and \$8.50 for a table. How much change did she receive from \$20?
7. At \$2.05 an hour, how long will it take a man to earn \$69.70?
8. A butcher bought meat at 73 cents a pound and sold it at 89¢ a pound. What was his gain on 23 pounds?
9. Find the cost of putting a molding around the 4 sides of a room 9 ft. square at 10¢ a foot.
10. At 25¢ a peck find the cost of 5 bushels of potatoes.

TEST 18

1. (a) $\$26.09 + \$5.63$ (b) 24 oz. = (?) lb.
2. (a) $\$3.90 \times 480$ (b) $8000 - 2999$
3. (a) $\$.08\overline{)\$411.20}$ (b) $4\overline{)20340}$
4. (a) $53\overline{)5724}$ (b) $463\overline{)34725}$
5. (a) $9\frac{2}{7} = 8\frac{}{7}$ (b) $6\frac{13}{9} = 7\frac{}{9}$
6. From a piece of cloth $11\frac{1}{15}$ yd. long a piece $4\frac{4}{9}$ yd. was cut off. How many yards of material remain on the piece?
7. How many yards of fencing are needed for a field 48 feet wide and 144 ft. long?
8. The Collins family saves \$45 a month. How many months will they have to save to buy a television set for \$250 and an automatic washer for \$155?
9. If 345 sweaters cost \$862.50, find the cost of 1 sweater.
10. The distance around the baseball field is 180 rods. How many times would Don have to walk around it to cover 720 rods?

TEST 19

1. (a) $706 + 218 + 74$ (b) $1210 - 1207$
2. (a) $7\frac{3}{4} - 6\frac{7}{8}$ (b) $\frac{7}{12} + \frac{8}{24}$
3. (a) 490×505 (b) $6\overline{)18270}$
4. (a) $12\overline{)1728}$ (b) ..... ? ..... ft. = 2 rod
5. (a) $205\overline{)6970}$ (b) $7\frac{4}{5} = 6\frac{}{5}$
6. A gross of pencils that cost \$7.20 were sold for \$.06 each. What was the gain?
7. What will it cost to frame a picture 14 inches on each side, if the frame costs \$.24 a foot?
8. The Cubs bought 120 baseballs for \$96. How much did they pay for each one?
9. If a grocer bought a crate containing 170 oranges for \$10.20, what did he pay for each orange?
10. Tom bought a knife for \$.40 and a ball for \$.20. What was his change from a dollar bill?

TEST 20

1. (a) $7\frac{1}{5} + 6\frac{3}{10}$ (b) $6\frac{1}{12} - 4\frac{3}{4}$
2. (a) $\$7.50 \times 403$ (b) $\$30 - \$7.06$
3. (a) (?) lb. = 1 Ton (b) $625 + 50 + 730$
4. (a) $10\frac{5}{8} = 9\frac{}{8}$ (b) $16\frac{7}{4} = 17\frac{}{4}$
5. (a) $144\overline{)1728}$ (b) DCLVII = ?
6. How many yards in the perimeter of a square table 5 ft. on one side?
7. How much is saved by buying potatoes at \$2.50 a bushel, instead of buying them at \$.75 a peck?
8. Patsy had 2 yd. of rayon. She used $\frac{7}{8}$ of a yard for a dress for her doll. How much did she have left?
9. Larry read 27 books over a certain period of time. If he read 3 each week, in how many weeks did he read the books?
10. At \$.25 a quart find the cost of 10 pk. of berries?

TEST 21

1. (a) From 6 take $\frac{3}{8}$ (b) $9\frac{3}{8}+2\frac{5}{6}$
2. (a) 1600×406 (b) $7\overline{)35475}$
3. (a) ? cwt. = 1 Ton (b) ? in. = 1 yd.
4. (a) $6\frac{3}{7}=5\frac{}{7}$ (b) $\frac{2}{3}+4\frac{1}{6}+8$
5. (a) $24\overline{)4896}$ (b) $703\overline{)47804}$
6. At \$1.50 a yd. find the cost of 9 ft. of braid.
7. Find the number of yards in the perimeter of a square table 14 feet on each side.
8. Betty practiced $2\frac{1}{2}$ hr. on Monday, 3 hr. on Tuesday, and $1\frac{3}{4}$ hr. on Wednesday. How many hours did she practice in all?
9. At \$.04 each, find the cost of 2 gross of pencils.
10. The Little Flower was born in MDCCCLXXII. What year was this?

TEST 22

1. (a) 2 Ton = ? lb. (b) $539+87+748$
2. (a) $6\frac{1}{2}+9\frac{1}{5}+4\frac{3}{10}$ (b) $17-7\frac{2}{5}$
3. (a) $9\frac{3}{10}=8\frac{}{10}$ (b) $8\frac{10}{7}=9\frac{}{7}$
4. (a) $8233-3255$ (b) $5\overline{)\$23.00}$
5. (a) 800×906 (b) $67\overline{)\$82.41}$
6. If an airplane travels at the rate of 220 miles an hour, how far does it travel in 30 minutes?
7. An advertising agency sent out 1563 letters on Monday, 2563 letters on Tuesday, and 2167 letters on Wednesday. How many letters did they send in the 3 days?
8. Before going to camp Bill was 3 pounds underweight. If he gained $2\frac{3}{4}$ lb., how many pounds underweight is he now?
9. How many yards are there in the perimeter of a square table 3 ft. on a side?
10. Change 640 rods to miles.

TEST 23

1. (a) $479+889+75$ (b) $4011-3559$
2. (a) From \$7 take \$4.05 (b) $\frac{1}{4}$ lb. = ? oz.
3. (a) $8000-1582$ (b) MCD
4. (a) 950×765 (b) $\$.04\overline{)\$21.00}$
5. (a) 507×980 (b) $436\overline{)29212}$
6. John picked $1\frac{1}{4}$ pecks of berries. He sold them at 20¢ a quart. How much did he receive for them?
7. A dealer had 12,048 cans of tomatoes. If he packed them in cartons of 24 cans each, how many cartons did he fill?
8. Mrs. Caldwell had $5\frac{1}{2}$ pounds of cherries. She used $2\frac{3}{4}$ lb. to make a pie. How many pounds of cherries had she left?
9. How many yards are there in the perimeter of a field 15 ft. long and 8 ft. wide?
10. Find the cost of 70 books at \$1.35 each.

TEST 24

1. (a) $8052 - 2377$ (b) 807×405
2. (a) 32 oz. = ? lb. (b) 3 Tons = ? lb.
3. (a) $6\overline{)\$42.54}$ (b) $\$5.40 \times 700$
4. (a) $527\overline{)33728}$ (b) $76\overline{)\$69.92}$
5. (a) $24 - 10\frac{3}{5}$ (b) $6\frac{2}{3} + 3\frac{5}{9}$
6. How many rods of fencing will be needed to fence a field 1 mile long and 25 rods wide?
7. A farmer sold 18 gallons of milk at 16¢ a quart. How much did he receive?
8. Mrs. Thomas bought $6\frac{7}{8}$ yards of gingham and $4\frac{3}{10}$ yd. of muslin. How many yards of material did she buy?
9. Subtract $30\frac{7}{9}$ from $52\frac{7}{18}$. Add $8\frac{1}{2}$ to the answer.
10. 4 rods = ? yards?

TEST 25

1. (a) $1000 - 999$ (b) 904×806
2. (a) $2\frac{9}{8} = 3\frac{}{8}$ (b) $6\frac{3}{7} = \frac{}{7}$
3. (a) 1728×1506 (b) $3\overline{)10989}$
4. (a) $\$2.25 + \$.39$ (b) $15\overline{)3075}$
5. (a) $8\frac{5}{6} + 10\frac{1}{2}$ (b) $\frac{27}{35} \times \frac{14}{45}$
6. These are Tom's marks in spelling for this week. 80, 95, 100, 95, 100. Find his average daily mark.
7. Father paid \$298 for a television set. If this amount was \$35 less than the original price, what was the original price of the set?
8. John spent \$.50 for a ball, and \$1.75 for a bat. What was his change from \$3?
9. Find in feet the distance around a rectangular flower bed 12 in. long and 18 in. wide.
10. Write in figures: ninety million, ninety thousand, ninety.

TEST 26

1. (a) $12\frac{1}{6} + 9\frac{5}{18}$ (b) From 9 take $\frac{3}{4}$
2. (a) 72 in. = ? yd. (b) 15 pt. = ? gal.
3. (a) 9080×607 (b) $45\overline{)3196}$
4. (a) $\$128 + \$.06 + \$7.09$ (b) $15{,}000 - 1009$
5. (a) $4\frac{1}{12} \times 7\frac{1}{2}$ (b) $6\frac{1}{4} - 2\frac{7}{12}$
6. Write in figures: seventeen million, eighty thousand, forty-one.
7. At a recent sale, dresses were reduced \$2.25. If this reduction brought the price of each to \$12.50, what was the original price?
8. If Harry can do 10 problems in 15 minutes, what was the average time spent on each problem?
9. If chicken is selling for \$.40 a pound, how many pounds can be bought for \$3.20?
10. Paul ate $\frac{5}{8}$ of a pie and Alice ate $\frac{1}{4}$ of a pie. What fractional part of the pie was left?

TEST 27

1. (a) 64 oz. = ? lb. (b) 6 lb. = ? oz.
2. (a) $10{,}000 - 9{,}999$ (b) $405\overline{)39690}$
3. (a) $9\overline{)72108}$ (b) 9080×506
4. (a) $2\frac{5}{8} + 5 + 3\frac{7}{12}$ (b) $6\frac{3}{10} \times 2\frac{2}{9}$
5. (a) MCMLX (b) 1000 cents = ... dollars
6. Bill is 52 inches tall and Jim is $4\frac{1}{2}$ inches taller. What is Jim's height?
7. Frank's kite string was 550 ft. long. The string caught in a tree and broke. Frank had left in his hand 56 ft. of string. How much remained attached to the kite?
8. If a train travels at the rate of 45 m.p.h., how long will it take to go 750 mi.?
9. Write in figures: eighteen million, nine hundred four thousand, three.
10. If there are 32 qt. in 1 bu., how many bu. are there in 160 quarts?

TEST 28

1. (a) $10 \div \frac{5}{8}$ (b) $2 - 1\frac{5}{8}$
2. (a) $6\frac{2}{9} \times \frac{3}{8}$ (b) $\frac{1}{2}$ yr. = (?) mo.
3. (a) $72\overline{)28872}$ (b) $6000 - 32$
4. (a) $6\frac{5}{18} + 4\frac{1}{12} + \frac{8}{9}$ (b) From 8 take $4\frac{3}{5}$
5. (a) LXVII (b) 3 gal. = (?) pt.
6. Take the sum of $\frac{7}{8}$, $\frac{5}{12}$ and $\frac{3}{4}$ from 3.
7. What would it cost to frame a picture whose perimeter is 84 in. at \$.50 a foot?
8. At $1\frac{1}{5}$ a yard, find the cost of $4\frac{1}{2}$ yards of material.
9. Mrs. Smith bought a dress that had been reduced \$2.50 from the original price. If she paid \$15 for the dress, find the original price.
10. At \$2 a bushel, what will 3 pecks of chestnuts cost?

TEST 29

1. (a) $21\frac{3}{8} - 16\frac{3}{4}$ (b) $3\frac{1}{5} \times 4\frac{1}{6}$
2. (a) 1 yd. = (?) in. (b) $564\overline{)67680}$
3. (a) $6\frac{7}{10} + 9\frac{5}{6}$ (b) $1\frac{1}{15} \div 3\frac{1}{5}$
4. (a) \$34.52 + \$1.54 (b) $9000 - 8$
5. (a) 39 sq.ft. = sq.yd. (b) 2 rods = (?) yd.
6. Christine saved \$65. She used $\frac{4}{5}$ of it for a vacation trip. How much money had she left?
7. A dealer had $23\frac{1}{4}$ yards of linen. If $5\frac{1}{2}$ yd. were sold, how many yards were left?
8. A poster is 24 in. long and 9 in. wide. How many feet of colored tape will be needed to go around it?
9. If oranges are sold at \$.60 a dozen, find the cost of 4 oranges.
10. At $\$6\frac{2}{5}$ each, find the cost of 4 chairs.

TEST 30

1. (a) $\frac{4}{5}+4\frac{5}{8}$ (b) $\frac{14}{15}\div\frac{14}{15}$
2. (a) $1\frac{3}{4}\times\frac{10}{21}$ (b) $4\frac{2}{3}-2\frac{5}{6}$
3. (a) 3 rd. = (?) yd. (b) $524\overline{)105848}$
4. (a) MDCCLXXVI (b) (?) sq. in. = 1 sq. ft.
5. (a) $6000-47$ (b) 5040×307
6. Norabel read 1248 words in 6 minutes when her reading speed was being tested. How many words did she average a minute?
7. How much would a farmer receive for 30 gallons of milk at 18¢ a quart?
8. Mrs. Conners bought $4\frac{1}{2}$ yards of lace at 24¢ a yard and $2\frac{1}{2}$ yards of ribbon at 30¢ a yard. How much change did she receive from 5 dollars?
9. Change 18 inches to feet.
10. At a speed of 45 m.p.h., how far will a man travel in $7\frac{1}{5}$ hours?

TEST 31

1. (a) $8\frac{3}{4}+2\frac{1}{2}-\frac{5}{6}$ (b) $\frac{5}{9}$ of 21
2. (a) $1\frac{3}{8}-\frac{7}{12}$ (b) $1\frac{1}{4}\times3\frac{1}{5}$
3. (a) $594\overline{)68310}$ (b) 100×18
4. (a) $7\frac{1}{2}$ ft. = (?) yd. (b) $2\frac{7}{10}\div\frac{18}{25}$
5. (a) $3040-58$ (b) (?) cwt. = 2T.
6. How much does a man earn in $5\frac{1}{3}$ hours if he makes $\$1\frac{1}{4}$ an hour?
7. How many feet of frame will be required to frame a picture 15″ by 18″?
8. How many square yards are there in a table $6\frac{2}{3}$ ft. long and $3\frac{3}{5}$ ft. wide?
9. If a plane covers 208 miles in an hour, how far will it go in $\frac{3}{4}$ of an hour?
10. If a plane can fly 180 miles in $\frac{5}{6}$ of an hour, how far will it go in 1 hour?

TEST 32

1. (a) $16\frac{2}{3}+3\frac{1}{2}$ (b) (?) sq. rd. = 1 acre
2. (a) 288 eggs = (?) doz. (b) $79\overline{)4977}$
3. (a) $3\frac{3}{4}\times5\frac{8}{9}$ (b) $8\div2\frac{2}{5}$
4. (a) 3080×407 (b) $9\overline{)27360}$
5. (a) $8001-78$ (b) 30 qt. = (?) gal.
6. Philip is 9 years old. His father is $3\frac{2}{3}$ times as old. How old is Philip's father?
7. How many $\frac{1}{2}$ yd. pieces of ribbon can be cut from $4\frac{1}{2}$ yd.?
8. From the sum of one-half and three-fifths, take one-third.
9. What is the cost of laying 42 square yards of floor covering at 21¢ per sq. foot?
10. Bob and Fred walked $10\frac{1}{2}$ miles in 3 hr. On the average, how far did they walk in one hour?

TEST 33

1. (a) 3090×205 (b) 1 hr. = ? sec.
2. (a) $78\overline{)6474}$ (b) 12 pt. = ? gal.
3. (a) $2\frac{3}{8}+5\frac{2}{3}+6$ (b) $3\frac{3}{5}\times 1\frac{1}{9}$
4. (a) $3\frac{5}{9}\times 5$ (b) $5\frac{5}{6}-2\frac{8}{9}$
5. (a) $6\frac{3}{4}=5\frac{}{4}$ (b) $18\div 1\frac{5}{7}$
6. At \$3.50 per sq. yd. find the cost of a rug 9 ft. wide and 12 ft. long.
7. Find the perimeter in yards of a strip of carpet $17\frac{1}{2}$ ft. long and $3\frac{1}{2}$ ft. wide.
8. Find the cost of $8\frac{3}{4}$ yd. of rayon at \$.92 a yard.
9. If an airplane can travel 320 mi. in 1 hr., how many miles will it travel in $\frac{2}{3}$ hr.?
10. A trapper in Canada setting his traps placed them at the following distances apart: $\frac{3}{8}$ mi., $\frac{2}{3}$ mi., $\frac{1}{6}$ mi., $\frac{5}{8}$ mi. What is the distance between the first and last trap?

TEST 34

1. (a) $1040\div 3\frac{1}{4}$ (b) $6\frac{1}{4}\times 240$
2. (a) $4\frac{5}{9}+2\frac{7}{12}$ (b) $14-6\frac{5}{12}$
3. (a) $1030-76$ (b) 3050×704
4. (a) $\frac{1}{8}$ mi. = ? yd. (b) $2\frac{1}{4}$ lb. = ? oz.
5. (a) 1 A = ? sq. yd. (b) $423\overline{)19881}$
6. At \$.08 a foot find the cost of $10\frac{1}{2}$ ft. of wire.
7. At 50 m.p.h., how far will a train go in $1\frac{2}{5}$ hr.?
8. If a train goes 30 miles in $\frac{3}{4}$ of an hour, how far will it go in 1 hour?
9. Canada has an area of 3,842,110 square miles. This is divided into 10 different sections. If these sections were all the same size, what would be the area of each?
10. Write: two million, forty-nine thousand in figures.

TEST 35

1. (a) $\frac{15}{16}\div\frac{5}{24}$ (b) $9\frac{1}{3}-2\frac{2}{5}$
2. (a) $320\overline{)20800}$ (b) 3 ft. = ? in.
3. (a) $13\frac{7}{9}+20\frac{5}{6}$ (b) $5\frac{1}{3}\times 1\frac{7}{8}$
4. (a) 11 pk. = ? bu. (b) 3 ft. 8 in. = ? in.
5. (a) 6070×408 (b) $2000-89$
6. Take the sum of $1\frac{3}{7}$ and $2\frac{5}{9}$ from 6.
7. In the year 1940 Canada was allowed to send 58,000 pelts to the United States. The following year this number was increased to 70,000. What was the amount of increase?
8. In a recent year Ohio produced about 122,000 bu. of corn, and Iowa produced about 540,000 bu. How much more corn did Iowa produce?
9. Tom fenced off a section of the yard for his dog. If it was 18 ft. long and $10\frac{1}{2}$ ft. wide, how many yards of wire fencing did he use?
10. Express with like denominators and tell which is the greatest in value: $\frac{3}{4}$, $\frac{5}{6}$, $\frac{2}{3}$.

TEST 36

1. (a) $9\frac{1}{2} - 2\frac{7}{10}$ (b) $15\frac{3}{5} \div 7\frac{4}{5}$
2. (a) $1\frac{1}{2}$ min. = ? sec. (b) 480 min. = ? hr.
3. (a) $6\frac{2}{3} \times 18$ (b) $\frac{4}{5}$ of 60
4. (a) ? sq. rd. = 1 A (b) $\frac{5}{8}$ mi. = ? rd.
5. (a) $2{,}041 - 76$ (b) 537×908
6. Find in square rods the area of a plot of ground 33 rods long and 6 rods wide.
7. If it costs $\frac{1}{4}$ of a cent to use the radio for one hour, what will it cost to use it for 12 hours?
8. Mr. Davis bought 14 rolls of wallpaper at \$.58 a roll. He also paid \$3.95 for paint. How much did he spend altogether?
9. A toy dealer paid \$12.50 for 250 tops. What did each top cost?
10. A test paper is about $8\frac{1}{4}$ inches wide. If you divide it into spaces $\frac{3}{4}$ in. wide, how many spaces will you have?

TEST 37

1. (a) $9\frac{4}{5} + 5\frac{3}{8}$ (b) $18\frac{3}{4} \div 8\frac{1}{3}$
2. (a) $16\frac{3}{4} - 8\frac{3}{5}$ (b) $3\frac{1}{3} \times \frac{3}{20}$
3. (a) $\frac{5}{8}$ of 196 (b) $9 - 2\frac{2}{5}$
4. (a) $81\overline{)77274}$ (b) $2\frac{1}{4} + 3\frac{3}{5} + 4\frac{3}{8}$
5. (a) \$8.03 × 56 (b) 700 − 275
6. The first settlers came to this country in 1607. This is how many years ago?
7. How much less than a mile is 880 yd.?
8. Write in figures: four hundred thousand, fifty-six.
9. How many fourths are there in $3\frac{1}{4}$?
10. John had \$4.50 in his bank. He spent $\frac{2}{5}$ of it for a ball and $\frac{3}{5}$ for a catcher's mitt. How much did he pay for each?

TEST 38

1. (a) $87\overline{)69687}$ (b) XC
2. (a) $3\frac{1}{4} \div 5\frac{4}{7}$ (b) $6\frac{3}{8} - 4\frac{7}{12}$
3. (a) $\frac{3}{5}$ yr. = ? days (b) $\frac{2}{3}$ mi. = ? ft.
4. (a) $8\frac{2}{3} \times 4\frac{1}{2}$ (b) $6\frac{3}{8} + 4\frac{5}{6}$
5. (a) \$80.30 − \$9.06 (b) 8007 × 609
6. Write in Roman numerals, 1951.
7. Bob earns \$36 a week. If he saves $\frac{2}{3}$ of this each week, how much will he save in a year?
8. It took pioneers about $6\frac{2}{3}$ hours to plow a field with a team of oxen. Today it takes only $\frac{5}{6}$ of an hour to plow a field with a tractor. How much time is saved by using a tractor?
9. Write in numbers: two hundred four thousand, fifty-six.
10. In our home 900 gallons of oil were used during the winter. What did it cost at $7\frac{1}{2}$ cents a gallon?

TEST 39

1. (a) $9000 - 8$ (b) 7002×805
2. (a) $89\overline{)4539}$ (b) XCIX
3. (a) $37\frac{1}{2} \div 9\frac{3}{8}$ (b) $8\frac{1}{9} - 4\frac{7}{10}$
4. (a) $7\frac{1}{9} \times 4\frac{1}{8}$ (b) $10\frac{2}{3} + 8\frac{4}{7}$
5. (a) $\frac{1}{4}$ ton = (?) lb. (b) 2 mi. = (?) yd.
6. During the holidays Tom and his father took a trip to the city. At the station they learned that the train would be $1\frac{1}{2}$ hr. late. After 45 minutes had passed how much longer had they to wait?
7. During the week Anne took care of a neighbor's child for 5 hours and was paid 60 cents an hour. She spent $\frac{3}{5}$ of this amount for her mother's birthday gift. How much did she pay for the gift?
8. Mr. Carroll bought 3 half-pound boxes of candy and 6 quarter-pound boxes of candy. At \$.50 a pound what was the total cost of the candy?
9. A fast bomber uses about 105 gallons of gasoline in 3 hour. How many gallons will it use in 5 hour?
10. If a gallon of gas weighs $7\frac{1}{5}$ lb., how much lighter will a plane be after a 5-hour flight using 30 gallons an hour?

TEST 40

1. (a) $10\frac{3}{5} + 16\frac{8}{9}$ (b) $6\frac{3}{8} - 4\frac{5}{6}$
2. (a) $\frac{5}{8} \div 10$ (b) $3\frac{5}{9} \times \frac{15}{16}$
3. (a) CXCIV (b) $93\overline{)86676}$
4. (a) $8090 - 509$ (b) 6070×408
5. (a) $5\frac{1}{4}$ bu. = (?) pk. (b) $3\frac{1}{2}$ gal. = (?) qt.
6. Tom spent $\frac{3}{5}$ of a dollar for a box of candy and $\frac{1}{10}$ of a dollar for a copybook. What fractional part of a dollar had he left?
7. How many acres are there in a field 130 rods long and 80 rods wide?
8. If a man earns \$15 in 2 days, how much will he earn in 6 days?
9. There are 8 persons in our family. If we allow $\frac{3}{8}$ lb. of bacon for each one's breakfast, how much will the bacon cost if it is \$.45 a lb.?
10. A boy had a pedometer which recorded the steps he took. If he found that in going $54\frac{1}{6}$ feet, he had taken 25 steps, what was the average length of each step?

TEST 41

1. (a) CCXLIV (b) $675\overline{)296325}$
2. (a) $4\frac{5}{6} + 6\frac{2}{3} + 3\frac{7}{12}$ (b) $5\frac{7}{24} - 2\frac{7}{8}$
3. (a) $8\frac{1}{4} \times 2\frac{3}{5}$ (b) $8\frac{1}{3} \div 7\frac{1}{7}$
4. (a) $\frac{7}{8}$ mi. = (?) yd. (b) $1\frac{3}{4}$ hr. = (?) min.
5. (a) 6007×60 (b) $2050 - 907$
6. How many $\frac{3}{4}$ bu. baskets can be filled with 12 bu. of potatoes?
7. John's father spends $\frac{1}{6}$ of his salary for rent and $\frac{5}{12}$ for food and clothing. What fractional part of his money has he left?
8. James measured a sheet of paper and found that it was just $8\frac{1}{2}$ in. wide. He wanted to cut it into 4 strips, all the same width. How wide would each strip be?
9. Mr. Smith bought 8 hams, each weighing $12\frac{3}{4}$ lb. How much did he receive for them if he sold them at \$1.10 per lb.?
10. Write in figures: seven hundred seventy-seven thousand, seven hundred seven.

TEST 42

1. (a) MCMXL (b) $432\overline{)15552}$
2. (a) $\frac{3}{4}$ bu. = (?) pk. (b) $\frac{5}{8}$ mi. = (?) ft.
3. (a) $1\frac{9}{16}+5\frac{3}{4}+7\frac{5}{8}$ (b) $10\frac{4}{9}-8\frac{3}{4}$
4. (a) $3\frac{2}{5}\times1\frac{8}{9}$ (b) $8\frac{1}{6}\div\frac{7}{12}$
5. (a) 4030×608 (b) $6003-2734$
6. Jane needs 126 cakes for her party. How much will they cost at 18¢ a dozen?
7. Write in Roman Numerals 1454.
8. Bob wants a pair of skates that costs \$5.98. He feels he can save \$.90 a week for 6 weeks. How much would he lack to pay for the skates?
9. Dan picks 84 qt. of berries. He sells $\frac{3}{4}$ of them at \$.35 a qt. How much does he receive?
10. The length of a rectangular field is 240′ and its width is 25′. Find its perimeter.

TEST 43

1. (a) $24{,}100-10174$ (b) $131472\div264$
2. (a) $10-4\frac{3}{8}$ (b) $52\frac{1}{8}+25\frac{1}{3}$
3. (a) $6\frac{3}{4}\div1\frac{1}{8}$ (b) $5\frac{5}{9}\times3\frac{3}{5}$
4. (a) CCXLIX (b) 3057×405
5. (a) 800 rd. = (?) mi. (b) 165 oz. = (?) lb.
6. The air distance between Washington and Moscow is about 4896 mi. If a plane averages 204 mi. per hr., how many hours will it take to make the trip?
7. Find the cost of 6000 lb. of hay at \$4 a ton.
8. Which running track is longer, one 440 yd. long or another $\frac{1}{2}$ mi. long?
9. If an airpilot can cover a distance of 366 miles in 2 hours, how far can he go in 6 hours?
10. Write in figures: one hundred forty-five thousand, thirty-seven.

TEST 44

1. (a) $24009\div453$ (b) $80{,}000-24683$
2. (a) $8\frac{1}{6}-6\frac{5}{9}$ (b) $4\frac{5}{9}+2\frac{5}{6}$
3. (a) CMXLIX (b) $68413\div76$
4. (a) $7\frac{1}{5}\div2\frac{7}{10}$ (b) 6380×409
5. (a) (?) lb. = 1 T. (b) (?) sq. ft. = 1 sq. yd.
6. 186 air-mail pilots flew 175,770 miles daily. How many miles, on the average, did each pilot fly?
7. A pilot in training flew his plane $15\frac{1}{4}$ hr. during a period of 4 days. The first day he flew $3\frac{1}{4}$ hr., the second, $4\frac{1}{3}$ hr., the third day $4\frac{5}{6}$ hr. How many hours did he fly the fourth day?
8. A blackboard is 9 ft. 4 in. long and 3 ft. 3 in. wide. Find its perimeter.
9. If an airplane can fly 3 mi. per minute, how far can it go in 35 flying hours?
10. Six girls shared 4 bars of candy equally. How much did each girl receive?

TEST 45

1. (a) $11268 \div 313$ (b) $60000 - 26795$
2. (a) $4\frac{3}{4} + 2\frac{1}{3} + \frac{1}{12}$ (b) $10\frac{1}{8} - 5\frac{5}{8}$
3. (a) 27 in. = ? yd. (b) 2 lb. 8 oz. = ? oz.
4. (a) 3007×307 (b) 33 yd. = ? rd.
5. (a) $4\frac{1}{5} \times 12$ (b) $3\frac{3}{4} \div 3\frac{3}{4}$
6. Write in Roman Numerals 469.
7. The regular price of a bicycle is \$39.60. If the price is reduced $\frac{1}{4}$, what will be the selling price?
8. Using the scale of $\frac{1}{4}$ in. to 10 ft., draw a line which represents 90 ft.
9. Find the perimeter of a rectangle $4' \times 6\frac{3}{4}'$.
10. Harry receives 30¢ an hour for cutting the grass. How much should he receive if he works 3 hr. and 45 minutes?

TEST 46

1. (a) $77\frac{3}{4} - 27\frac{1}{2}$ (b) $8\frac{2}{3} \times \frac{1}{13}$
2. (a) $3\frac{2}{3} \div 7\frac{1}{3}$ (b) $2\frac{3}{4} + 3 + 6\frac{7}{12}$
3. (a) $221430 \div 726$ (b) $9000 - 20$
4. (a) 8004×907 (b) 42 qt. = ? pk.
5. (a) 12 oz. = ? lb. (b) 6 sq. ft. = ? sq. yd.
6. Write in figures: thirty thousand, three hundred five.
7. If $18\frac{3}{4}$ lb. of corn is taken out of a bag containing 100 lb. of corn, how many pounds will be left in the bag?
8. Bobby is drawing a map. If $\frac{5}{8}$ in. on his map represents 1 mile, how long a line should he draw to represent 5 miles?
9. How much seed will be needed for a grass plot 80 ft. long and 40 ft. wide, if 1 lb. of seed is enough for 200 sq. ft.?
10. Some metal plates used in airplanes are $\frac{1}{5}$ in. thick. How many such plates would there be in a pile 2 inches high?

TEST 47

1. (a) $19\frac{1}{5} - 18\frac{3}{8}$ (b) $16\frac{4}{5} + 60\frac{5}{8}$
2. (a) 1 pt. = ? qt. (b) 528 ft. = ? mi.
3. (a) $8\frac{1}{4} \div 1\frac{3}{8}$ (b) $3\frac{7}{8} \times 8\frac{1}{3}$
4. (a) $79384 \div 98$ (b) MCMLIV
5. (a) 6007×430 (b) $6080 - 4596$
6. The wing span of an airplane is 86 ft. How long a line will represent this wing span using 1 in. = 4 ft.?
7. Jerry's spelling grades for this week are: 80, 75, 90, 90, 85. Find his daily spelling average.
8. Make a graph to show that Jerry's marks in 5 arithmetic tests were: 80, 75, 90, 85, 95.
9. How much would be left from \$20 after a dozen towels were bought at 75¢ each, and a dozen cakes of soap at 25¢ a cake?
10. How many hours are there from 8:30 A.M. to 11:45 A.M.?

HOLY GHOST

ENLIGHTEN US

Drill and Mental can be fun
For you and me and everyone.
The Holy Ghost will help you find
The speedy way to use your mind.

UNIT 10 • DRILL AND MENTAL

Drill 1

9	6	8	7	7	6	3	8	7	9
2	6	3	5	4	5	4	4	0	3

12	11	12	7	11	12	12	11	11	7
−3	−4	−6	−0	−2	−4	−5	−8	−6	−4

Add 2 to: 9, 39, 59, 99, 79, 12, 22, 42, 82, 102

Take 2 from: 11, 31, 51, 91, 71, 61, 21, 41, 101

1×2 3×2 5×2 6×2 2×2 4×2

2)4 10 8 6 12 3 5 9 7 11

Drill 2

9	7	8	8	7	9	4	3	9	0
4	7	5	6	6	5	7	6	3	5

5	12	13	9	14	13	14	13	14	13
−0	−3	−9	−6	−5	−6	−8	−8	−7	−6

Add 3 to: 8, 28, 78, 98, 68, 38, 58, 48, 88, 108

Take 3 from:

21, 51, 91, 81, 61, 71, 11, 31, 41, 101

7×2 9×2 11×2 8×2 12×2 0×2

2)16 20 40 0 22 18 15 13 19 17

Mental 1

1. Seven increased by two is (?).
2. Eleven is two greater than (?).
3. At $.20 a pound find the cost of 6 lb.
4. If 6 baseballs cost $1.20, find the price of one.
5. Seven quarts = (?) pints.

Mental 2

1. Three more than nine is (?).
2. Eleven minus three is (?).
3. Find $\frac{1}{2}$ of 80¢.
4. Change 2 ft. to inches.
5. Zero times 2 = (?).

Drill 3

9	8	8	9	6	8	6	7	6	8
6	8	7	7	8	4	4	6	5	5
—	—	—	—	—	—	—	—	—	—
15	16	10	9	16	14	13	11	15	12
−6	−7	−4	−4	−8	−6	−6	−5	−8	−8
—	—	—	—	—	—	—	—	—	—

Add 4 to: 7, 37, 57, 97, 67, 14, 84, 24, 74, 104
Take 4 from:
31, 51, 71, 91, 61, 21, 81, 11, 41, 101
Multiply by 2: 8, 5, 0, 2, 7, 4, 6, 3, 9

$2\overline{)3\ \ 7\ \ 5\ \ 11\ \ 9\ \ 15\ \ 13\ \ 17\ \ 19\ \ 0}$

Mental 3

1. Which is the larger part of a whole: $\frac{1}{2}$ or $\frac{1}{4}$?
2. Which is the smaller part of a unit $\frac{1}{4}$ or $\frac{1}{8}$?
3. Ten quarts = (?) pints.
4. This week Jack earned $9. Last week he earned twice as much. How much did Jack earn last week?
5. How much less than eleven is four?

Drill 4

9	9	9	9	9	9	9	9	9	9
8	9	2	4	6	3	5	7	0	1
—	—	—	—	—	—	—	—	—	—
10	17	15	13	11	9	12	14	16	18
−1	−8	−9	−4	−9	−0	−3	−9	−7	−9
—	—	—	—	—	—	—	—	—	—

Add 5 to: 6, 16, 26, 96, 76, 36, 86, 56, 66, 46
Take 5 from:
41, 71, 21, 81, 11, 31, 51, 91, 61, 101
Multiply by 2: 7, 10, 9, 4, 8, 2, 6, 3, 5

$2\overline{)15\ \ 19\ \ 0\ \ 5\ \ 11\ \ 7\ \ 3\ \ 17\ \ 13\ \ 9}$

Mental 4

1. Five less than twenty-one is (?).
2. Write in figures: six thousand two hundred seventy-one.
3. One unit equals (?) fourths.
4. Write four-fifths as a fraction.
5. Which is a larger part: $\frac{1}{2}$ or $\frac{1}{8}$ of a thing?

Drill 5

6	7	3	9	8	5	8	7	8	9
3	3	8	3	5	9	7	9	9	9
—	—	—	—	—	—	—	—	—	—
17	15	13	11	9	12	14	16	18	10
−9	−8	−5	−3	−6	−9	−5	−7	−9	−3
—	—	—	—	—	—	—	—	—	—

Add 6 to: 5, 15, 35, 55, 65, 45, 25, 75, 95, 85
Take 6 from:
11, 31, 21, 61, 71, 51, 41, 81, 91, 101
Multiply by 3: 2, 0, 4, 1, 3, 6, 5, 7, 8

$3\overline{)3\ \ 0\ \ 6\ \ 12\ \ 9\ \ 15\ \ 21\ \ 18\ \ 27\ \ 24}$

Mental 5

1. What will 9 chairs cost at $3 each?
2. What did Bill earn per week if he earned $18 in 3 weeks?
3. There are 51 children in our class. Yesterday 6 were absent. How many were present?
4. In 9 yards there are (?) feet?
5. One-third of twenty-one cents = (?) cents.

Drill 6

8	8	8	8	4	8	4	7	0	6
8	6	7	4	9	2	7	2	6	7
—	—	—	—	—	—	—	—	—	—
13	11	12	17	14	16	13	10	9	6
−7	−4	−8	−9	−6	−8	−9	−2	−7	−0
—	—	—	—	—	—	—	—	—	—

Add 7 to: 4, 14, 34, 54, 74, 44, 24, 84, 64, 94
Take 7 from:
11, 21, 31, 51, 41, 91, 61, 81, 101, 71
Multiply by 3: 6, 4, 2, 8, 1, 3, 5, 7, 9

$3\overline{)3\ \ 12\ \ 15\ \ 9\ \ 18\ \ 6\ \ 27\ \ 21\ \ 0\ \ 24}$

Mental 6

1. If the cost of 3 desks was $27, what was the price of one?
2. 14 increased by 7 is (?).
3. John has 31¢. Ben has 7¢ less than John. How much has Ben?
4. Zero added to 9 = (?).
5. If one book costs $.90, find the cost of 3.

Drill 7

5	6	7	9	7	6	5	0	8	9
4	5	6	6	7	6	5	4	8	9

10	12	14	16	18	13	11	9	15	4
−5	−6	−7	−8	−9	−6	−5	−4	−6	−0

Add 8 to: 3, 33, 93, 43, 13, 83, 53, 63, 73, 23
Take 8 from:
11, 41, 91, 61, 21, 81, 71, 51, 31, 101
Multiply by 3: 6, 1, 3, 9, 5, 8, 7, 4, 2, 10

3)3	4	7	5	8	10	13	11	14	16

Mental 7

1. Three boys earned $.60. What was each boy's share?
2. Robert earns 25¢ each Saturday. How much does he earn in 3 weeks?
3. In the fraction $\frac{3}{4}$ the numerator is (?).
4. What is 31 decreased by 8?
5. What is 33 increased by 8?

Drill 8

7	3	6	7	9	9	3	6	8	0
2	8	8	9	9	5	9	4	5	8

8	12	16	9	11	18	10	13	14	14
−0	−9	−7	−2	−3	−9	−6	−5	−9	−6

Add 9 to: 2, 32, 72, 92, 52, 22, 82, 42, 62, 102
Take 9 from: 32, 52, 72, 92, 62, 82, 22, 42

3)9	18	3	27	30	21	12	6	15	24

3)4	7	10	13	16	19	22	25	28	26

Mental 8

1. When you divide 29 by 3 the remainder is (?).
2. If one rug cost $70, what will 3 rugs cost?
3. In the fraction $\frac{7}{9}$ the denominator is (?).
4. If John weighs 69 pounds, how much must he gain to weigh 72 pounds?
5. 8 yd. = (?) ft.

Drill 9

9	7	5	4	2	0	8	6	5	3
8	8	8	7	7	6	8	7	6	7

10	13	6	11	15	17	11	16	9	13
−7	−6	−0	−4	−8	−9	−6	−8	−2	−5

Add 3 to: 9, 49, 79, 99, 29, 33, 53, 69, 83, 103
Take 3 from: 32, 72, 92, 22, 12, 82, 62, 52

3)21	30	24	27	18	9	12	15	6	3

3)5	8	11	14	13	10	7	19	17	16

Mental 9

1. What is 49 increased by 3?
2. What is 22 decreased by 3?
3. In the fraction $\frac{5}{8}$ the numerator is (?).
4. In one whole there are (?) fifths.
5. Write 74 in Roman Numerals.

Drill 10

5	9	8	6	7	8	4	8	8	0
4	7	3	9	5	6	9	2	9	7

7	10	14	15	16	9	11	12
−0	−2	−6	−9	−7	−5	−3	−5

Add 4 to: 58, 98, 38, 68, 76, 48, 28, 18, 88
Take 4 from: 32, 72, 52, 42, 92, 13, 62, 102

3)3	9	15	24	12	21	27	6	18	30

3)19	22	25	28	20	23	26	29	17	16

Mental 10

1. What is 38 increased by 4?
2. What is 22 decreased by 4?
3. At $.80 an hour, how much can Dick earn in 3 hours?
4. After Tom lost 4 marbles he had 18 left. How many had he at first?
5. What fraction does not have the same denominator? $\frac{3}{7}$ $\frac{1}{7}$ $\frac{2}{7}$ $\frac{4}{5}$ $\frac{6}{7}$

Drill 11

9	4	9	2	8	3	8	5	6	3
9	1	8	4	8	4	7	3	8	6

Add 5 to: 7, 27, 57, 77, 36, 67, 17, 47, 87, 97

Take 5 from: 12, 32, 72, 92, 81, 62, 22, 42, 52

3)6 9 15 24 18 27 30 21 12 3

3)22 29 25 23 28 26 19 20 17 18

3)4 7 10 13 5 8 11 14 16 0

Mental 11

1. What is 27 increased by 5?
2. What is 32 decreased by 5?
3. How many yards are there in 29 feet?
4. Write in figures: two million eight hundred sixty-five thousand nine.
5. CXX = ...(?)... .

Drill 12

9	18	14	5	17	8	15	6	16
−6	−9	−6	−4	−8	−3	−7	−2	−8

Add 6 to: 6, 26, 66, 86, 15, 46, 76, 56, 36, 16

Take 6 from: 12, 42, 92, 52, 72, 31, 82, 62, 32

Multiply by 4: 2, 5, 7, 0, 9, 4, 8, 10, 3, 6

4)24 16 8 20 0 28 4 12 36 32

4)7 9 13 17 21 25 29 10 11 14

Mental 12

1. What is 27 increased by 6?
2. What is 32 decreased by 6?
3. At $9 a week, how much will John earn in 4 weeks?
4. One unit equals ...(?)... sevenths.
5. At an average speed of 7 m.p.h. how long will it take a boat to go 28 miles?

Drill 13

6	6	7	5	4	9	0	6	7	9
4	7	8	7	7	3	6	6	7	8

Add 7 to: 5, 15, 65, 85, 45, 25, 34, 75, 35, 55

Take 7 from: 12, 62, 32, 92, 42, 11, 82, 72, 52

4)12 4 24 16 28 40 36 20 32 8

4)15 19 23 27 33 37 34 38 35 39

4)17 22 21 25 26 29 31 30 37 18

Mental 13

1. What is 25 increased by 7?
2. What is 42 decreased by 7?
3. When you divide 39 by 4, what is the remainder?
4. Write in figures: three million, twenty thousand, forty.
5. $1 = \frac{}{8}$

Drill 14

17	10	13	14	12	12	11	6	12	15
−9	−4	−6	−7	−6	−5	−4	−0	−3	−8

Add 8 to: 4, 14, 74, 84, 64, 23, 54, 44, 34, 24

Take 8 from: 12, 42, 62, 92, 82, 71, 52, 32, 22

4)8 12 20 4 32 40 16 28 36 24

4)10 14 9 11 13 15 22 18 38 34

4)29 33 37 30 34 38 31 35 39 27

Mental 14

1. One factor of 32 is 4, the other is ...(?)... .
2. How many cents are there in 4 dimes?
3. What is 42 decreased by 8?
4. What is the average speed of a boat that goes 120 miles in 4 hours?
5. What is 14 increased by 8?

Drill 15

9	4	8	5	4	3	2	8	5	3
9	9	4	6	6	8	5	6	8	0

Add 9 to: 3, 33, 53, 93, 72, 23, 43, 63, 83, 13

Take 9 from: 32, 12, 62, 42, 22, 71, 52, 82, 92

Multiply by 3, then by 4:

8, 6, 0, 5, 4, 10, 7, 9, 12, 11, 3

4)28 32 24 16 12 36 4 20 8 48

4)33 30 35 27 29 39 31 37 34 38

Mental 15

1. 13 increased by 9 is ....(?)....
2. 32 decreased by 9 is ....(?)....
3. If Roy saves $5 a month, how much will he save in a year?
4. One divisor of 45 is 5, the other is .....
5. Write in figures: Thirty-one million, two hundred ten thousand.

Drill 16

11	18	3	13	14	7	13	12	11	10
−6	−9	−0	−4	−6	−2	−8	−4	−3	−4

Add 4 to: 9, 19, 29, 69, 49, 89, 39, 56, 79, 59

Take 4 from: 13, 23, 93, 83, 52, 63, 73, 43, 33

Multiply by 5: 2, 7, 9, 5, 6, 8, 10, 12, 3, 4

5)10 15 5 40 20 30 25 45 35 50

5)6 7 11 12 16 17 21 22 26 27

Mental 16

1. $\frac{2}{3}$ is read two ....(?)....
2. If a train travels 200 miles in 4 hours, what is its speed per hour?
3. 23 is ....(?).... greater than 14.
4. When you divide 27 by 5, the remainder is ....(?)....
5. Write LXXV in Arabic numbers.

Drill 17

9	8	9	8	7	4	5	7	4	0
8	7	5	5	5	8	5	4	4	8

Add 5 to: 8, 18, 98, 48, 27, 68, 88, 58, 78, 38

Take 5 from: 13, 23, 73, 63, 53, 82, 43, 93, 83

Multiply by 5: 0, 2, 6, 4, 10, 8, 9, 12, 7, 5

5)25 45 30 50 35 40 15 10 20 60

5)8 9 13 14 18 19 28 24 23 29

Mental 17

1. When one of the factors of 40 is 5, what is the other factor?
2. 18 increased by 5 equals ....(?)....
3. 23 decreased by 5 equals ....(?)....
4. Write in figures: eight million, three hundred forty thousand, twenty-five.
5. There are 12 in. in 1 foot. How many feet are there in 60 inches?

Drill 18

8	15	14	12	13	10	11	12	17	8
−8	−8	−9	−8	−8	−5	−4	−5	−9	−0

Add 6 to: 7, 17, 57, 87, 47, 26, 67, 37, 77, 97

Take 6 from:

13, 23, 83, 73, 42, 33, 63, 93, 53, 43

Multiply by 5: 3, 0, 8, 6, 9, 7, 8, 10, 12, 4

5)10 25 30 35 45 40 55 50 60 15

5)31 32 36 37 41 42 46 47 33 34

Mental 18

1. Larry had 13¢. He paid 5¢ for a candy bar. How much had he left?
2. If one chair costs $5, find the cost of 9.
3. If Tom paid 60¢ for 5 copy books, how much did each cost?
4. 23 decreased by 6 equals ....(?)....
5. Write in figures: three million, nine hundred six thousand, two hundred thirty-one.

Drill 19

9	6	3	9	8	6	5	5	7	9
1	5	9	4	8	9	3	0	7	5

Add 5 to: 9, 19, 79, 69, 29, 38, 89, 49, 59, 99

Take 5 from:

14, 44, 34, 74, 64, 94, 24, 54, 93, 84

Multiply by 5, 3, 7, 8, 4, 2, 9, 0, 12, 10, 11

5)35	40	45	25	15	10	5	0	20	30
5)38	39	43	44	48	49	32	37	33	29

Mental 19

1. 19 increased by 5 is (?) .
2. Fourteen is 5 greater than (?) .
3. When you divide 49 by 5, the remainder is (?) .
4. At $.05 each, how many chocolate bars can Jane buy for $.30?
5. Write CD in Arabic numbers.

Drill 20

14	10	14	11	13	12	15	16	11	5
−7	−9	−9	−5	−4	−9	−9	−8	−8	−0

Add 6 to: 8, 18, 28, 48, 68, 98, 57, 88, 38, 78

Take 6 from:

94, 14, 34, 64, 84, 63, 74, 54, 24, 44

Multiply by 5: 6, 3, 9, 5, 7, 12, 8, 10, 4, 2

5)5	15	25	35	45	0	10	20	30	40
5)7	9	13	18	21	24	28	34	39	49
5)11	17	19	22	31	46	42	47	29	37

Mental 20

1. Reduce $\frac{15}{40}$ to lowest terms.
2. 94 decreased by 6 equals (?) .
3. When cherries sell at $.40 per pound, what will 5 lb. cost?
4. At 5 cents a yard, how many yards of wire can Tom buy for 45¢?
5. One unit = $\frac{}{12}$

Drill 21

8	6	8	9	6	6	7	3	0	8
8	9	6	3	5	7	7	8	4	5

Add 7 to: 7, 17, 27, 87, 36, 47, 67, 57, 97, 77

Take 7 from:

14, 34, 54, 94, 84, 23, 44, 64, 24, 74

Multiply by 6: 8, 6, 2, 0, 9, 5, 3, 4, 7

6)6	24	30	18	42	54	12	48	60	36
6)6	7	12	13	18	19	24	25	30	31

Mental 21

1. How much more than 17 is 24?
2. Reduce $\frac{24}{30}$ to lowest terms.
3. LXXXIX in Arabic numbers = (?) .
4. Marie spent 7 cents and had 17 cents left. How much had she at first?
5. How many 6-cent cakes can Helen buy for 42 cents?

Drill 22

Add 6 to: 9, 19, 39, 79, 99, 69, 29, 47, 49, 59

Take 6 from: 15, 45, 75, 95, 55, 85, 25, 34, 65

Multiply by 6: 8, 3, 10, 2, 9, 5, 6, 4, 7, 0

6)54	48	30	42	72	60	18	0	24	12

Change to improper fractions:

$3\frac{1}{6}$, $2\frac{1}{6}$, $4\frac{5}{6}$, $8\frac{1}{6}$, $9\frac{1}{6}$, $5\frac{1}{6}$, $7\frac{5}{6}$, $10\frac{1}{6}$

Change to mixed numbers:

$\frac{31}{6}$ $\frac{19}{6}$ $\frac{11}{6}$ $\frac{25}{6}$ $\frac{13}{6}$ $\frac{21}{6}$ $\frac{61}{6}$ $\frac{17}{6}$ $\frac{29}{6}$

Mental 22

1. Change $\frac{25}{6}$ to a mixed number.
2. Bill's and Nancy's ages together are 15 years. If Nancy is 6 years old, how old is Bill?
3. How many 6-cent prize packages can be bought with 48 cents?
4. Estimate the cost of 6 chairs at $3.98 each.
5. Write in figures: eight million, two hundred four thousand, sixty.

Drill 23

Add 7 to: 8, 28, 48, 68, 56, 78, 88, 38, 17, 98

Take 7 from:

15, 25, 45, 75, 95, 85, 74, 65, 55, 35

Multiply by 6: 3, 8, 10, 7, 5, 9, 6, 12, 0, 4

$6\overline{)}\ 18\ \ 30\ \ 24\ \ 48\ \ 36\ \ 54\ \ 60\ \ 42\ \ 12\ \ 72$

Change to improper fractions:

$4\frac{5}{6},\ 5\frac{5}{6},\ 8\frac{1}{6},\ 9\frac{1}{6},\ 7\frac{1}{6},\ 6\frac{5}{6},\ 3\frac{5}{6},\ 10\frac{1}{6}$

Change to mixed numbers:

$\frac{23}{6}\ \ \frac{29}{6}\ \ \frac{35}{6}\ \ \frac{55}{6}\ \ \frac{49}{6}\ \ \frac{61}{6}\ \ \frac{41}{6}\ \ \frac{43}{6}\ \ \frac{13}{6}$

Mental 23

1. Estimate the answer: 6 boxes of writing paper at $.48 a box.
2. Change $4\frac{5}{6}$ to an improper fraction.
3. How many quarts are there in 6 gallons?
4. At what speed per hour must a boat go to travel 54 mi. in 6 hr.?
5. Reduce $\frac{18}{30}$ to lowest terms.

Drill 24

Add 6 to: 9, 19, 49, 52, 69, 72, 99, 38, 82, 49

Take 6 from: 15, 35, 95, 85, 45, 24, 75, 55, 65

Multiply by 6: 8, 9, 12, 4, 7, 6, 3, 1, 5, 2

Change to whole numbers:

$\frac{36}{6}\ \ \frac{42}{6}\ \ \frac{48}{6}\ \ \frac{54}{6}\ \ \frac{30}{6}\ \ \frac{72}{6}\ \ \frac{60}{6}\ \ \frac{18}{6}\ \ \frac{24}{6}$

Change to mixed numbers:

$\frac{37}{6}\ \ \frac{73}{6}\ \ \frac{35}{6}\ \ \frac{43}{6}\ \ \frac{49}{6}\ \ \frac{19}{6}\ \ \frac{29}{6}\ \ \frac{25}{6}\ \ \frac{55}{6}\ \ \frac{61}{6}$

Mental 24

1. 35 decreased by 6 = ...(?)....
2. Which of the following is a proper fraction? $\frac{3}{2}\ \ \frac{3}{4}\ \ \frac{5}{5}\ \ \frac{6}{5}\ \ \frac{8}{8}$
3. $\frac{5}{6} = \frac{}{48}$
4. Reduce $\frac{30}{54}$ to lowest terms.
5. Change $\frac{37}{6}$ to a mixed number.

Drill 25

Add 7 to: 8, 78, 28, 98, 68, 37, 58, 48, 88, 18

Take 7 from: 15, 25, 65, 95, 34, 85, 45, 75, 55

$\frac{5}{6} = \frac{}{12}\ \ \frac{}{24}\ \ \frac{}{36}\ \ \frac{}{48}\ \ \frac{}{18}\ \ \frac{}{54}\ \ \frac{}{30}\ \ \frac{}{42}\ \ \frac{}{72}\ \ \frac{}{60}$

Change to improper fractions:

$3\frac{1}{6},\ 5\frac{1}{6},\ 8\frac{1}{6},\ 2\frac{5}{6},\ 4\frac{5}{6},\ 9\frac{1}{6},\ 10\frac{5}{6},\ 7\frac{1}{6}$

Change to mixed numbers:

$\frac{43}{6}\ \ \frac{55}{6}\ \ \frac{29}{6}\ \ \frac{17}{6}\ \ \frac{49}{6}\ \ \frac{31}{6}\ \ \frac{65}{6}\ \ \frac{19}{6}\ \ \frac{37}{6}\ \ \frac{41}{6}$

Reduce: $\frac{6}{18}\ \ \frac{6}{30}\ \ \frac{6}{48}\ \ \frac{6}{54}\ \ \frac{6}{12}\ \ \frac{6}{42}\ \ \frac{6}{60}\ \ \frac{6}{72}$

Mental 25

1. Change $\frac{55}{6}$ to a mixed number.
2. Reduce $\frac{30}{48}$ to lowest terms.
3. Which of the following is an improper fraction? $\frac{1}{2}\ \ \frac{3}{4}\ \ \frac{5}{6}\ \ \frac{8}{8}\ \ \frac{7}{8}\ \ \frac{2}{3}$
4. Write XCIII in Arabic numbers.
5. Write in figures: three million, two hundred twenty thousand, five hundred two.

Drill 26

Add 7 to: 9, 19, 39, 79, 89, 49, 59, 28, 29, 69

Take 7 from: 16, 36, 86, 26, 96, 76, 56, 45, 46

Reduce: $\frac{18}{24}\ \ \frac{24}{30}\ \ \frac{30}{36}\ \ \frac{42}{48}\ \ \frac{48}{54}\ \ \frac{54}{60}\ \ \frac{42}{72}\ \ \frac{36}{66}$

Change to mixed nunbers:

$\frac{25}{6}\ \ \frac{29}{6}\ \ \frac{31}{6}\ \ \frac{35}{6}\ \ \frac{43}{6}\ \ \frac{47}{6}\ \ \frac{55}{6}\ \ \frac{59}{6}\ \ \frac{53}{6}$

Multiply by 7: 6, 3, 2, 8, 4, 10, 5, 7, 9, 0

$7\overline{)}\ 7\ \ 21\ \ 42\ \ 14\ \ 63\ \ 28\ \ 56\ \ 49\ \ 70\ \ 35$

Mental 26

1. Estimate the answer: 3 pairs of skates at $3.10 a pair.
2. Which of the following is equal to a unit?
   $\frac{5}{8}\ \ \frac{7}{8}\ \ \frac{3}{4}\ \ \frac{1}{5}\ \ \frac{4}{4}\ \ \frac{6}{7}\ \ \frac{8}{9}$
3. At 40 m.p.h. how far will a train go in 6 hr.?
4. Write XXXII in Arabic numbers.
5. How many less than 26 is 17?

Drill 27

Add 8 to: 8, 28, 48, 68, 98, 18, 78, 37, 38, 58

Take 8 from: 16, 36, 56, 96, 25, 66, 26, 76, 46

Reduce: $\frac{7}{42}$ $\frac{7}{56}$ $\frac{7}{21}$ $\frac{7}{63}$ $\frac{7}{49}$ $\frac{7}{70}$ $\frac{7}{28}$ $\frac{7}{84}$ $\frac{7}{14}$

$\frac{2}{7} = \frac{}{14}$ $\frac{}{56}$ $\frac{}{28}$ $\frac{}{63}$ $\frac{}{49}$ $\frac{}{35}$ $\frac{}{21}$ $\frac{}{42}$

Change to improper fractions:

$3\frac{2}{7}$ $5\frac{5}{7}$ $4\frac{2}{7}$ $6\frac{3}{7}$ $8\frac{4}{7}$ $9\frac{5}{7}$ $7\frac{1}{7}$ $2\frac{6}{7}$

Change to mixed numbers:

$\frac{36}{7}$ $\frac{43}{7}$ $\frac{16}{7}$ $\frac{24}{7}$ $\frac{29}{7}$ $\frac{32}{7}$ $\frac{38}{7}$ $\frac{40}{7}$ $\frac{44}{7}$ $\frac{46}{7}$

Mental 27

1. Change $6\frac{3}{7}$ to an improper fraction.
2. Change $\frac{38}{7}$ to a mixed number.
3. At \$.70 a doz. find the cost of 7 doz. oranges.
4. When one factor of 42 is 7, what is the other factor?
5. Estimate the answer: five books at \$1.95 each.

Drill 28

Add 8 to: 9, 29, 49, 79, 88, 69, 99, 39, 59, 19

Take 8 from: 17, 27, 57, 87, 76, 97, 37, 77, 47

Reduce: $\frac{14}{70}$ $\frac{21}{28}$ $\frac{28}{63}$ $\frac{21}{56}$ $\frac{35}{49}$ $\frac{56}{63}$ $\frac{35}{42}$ $\frac{7}{84}$

$\frac{6}{7} = \frac{}{14}$ $\frac{}{21}$ $\frac{}{35}$ $\frac{}{49}$ $\frac{}{63}$ $\frac{}{56}$ $\frac{}{28}$ $\frac{}{42}$ $\frac{}{70}$

Change to improper fractions:

$3\frac{2}{7}$ $4\frac{5}{7}$ $6\frac{1}{7}$ $4\frac{3}{7}$ $8\frac{2}{7}$ $7\frac{3}{7}$ $9\frac{4}{7}$ $10\frac{6}{7}$ $5\frac{4}{7}$

Change to whole or mixed numbers:

$\frac{21}{7}$ $\frac{24}{7}$ $\frac{28}{7}$ $\frac{30}{7}$ $\frac{35}{7}$ $\frac{39}{7}$ $\frac{42}{7}$ $\frac{45}{7}$ $\frac{49}{7}$ $\frac{52}{7}$

Mental 28

1. In the fraction $\frac{6}{7}$ the numerator is (?) .
2. A whole number and a fraction is called a (?) .
3. Which of the following fractions is in its lowest terms? $\frac{6}{8}$ $\frac{5}{6}$ $\frac{6}{9}$ $\frac{4}{8}$ $\frac{5}{10}$
4. Estimate the cost of 7 desks at \$6.90 per desk.
5. Write CCVI in Arabic numbers.

Drill 29

Reduce: $\frac{21}{70}$ $\frac{28}{35}$ $\frac{35}{49}$ $\frac{49}{63}$ $\frac{63}{70}$ $\frac{21}{56}$ $\frac{7}{84}$ $\frac{35}{42}$ $\frac{21}{77}$

$\frac{3}{7} = \frac{}{14}$ $\frac{}{35}$ $\frac{}{63}$ $\frac{}{49}$ $\frac{}{56}$ $\frac{}{42}$ $\frac{}{28}$ $\frac{}{21}$ $\frac{}{70}$

Change to improper fractions:

$6\frac{3}{7}$, $7\frac{4}{7}$, $8\frac{2}{7}$, $9\frac{3}{7}$, $5\frac{6}{7}$, $4\frac{5}{7}$, $9\frac{6}{7}$, $8\frac{4}{7}$, $7\frac{5}{7}$

Change to whole or mixed numbers:

$\frac{35}{7}$ $\frac{40}{7}$ $\frac{42}{7}$ $\frac{46}{7}$ $\frac{49}{7}$ $\frac{52}{7}$ $\frac{56}{7}$ $\frac{60}{7}$ $\frac{63}{7}$ $\frac{66}{7}$

Multiply by 8: 3, 2, 5, 7, 9, 6, 4, 0, 8

8)8 24 48 16 40 56 72 32 64 80

Mental 29

1. $\frac{3}{7} = \frac{}{56}$
2. Change $9\frac{3}{7}$ to an improper fraction.
3. Which of the following fractions is in its lowest terms? $\frac{21}{28}$ $\frac{7}{35}$ $\frac{7}{15}$ $\frac{7}{14}$
4. If Joseph earns \$.70 a day, how much will he earn in 5 days?
5. $1 = \frac{}{7}$

Drill 30

Reduce: $\frac{14}{21}$ $\frac{7}{21}$ $\frac{14}{35}$ $\frac{35}{56}$ $\frac{21}{28}$ $\frac{63}{70}$ $\frac{49}{84}$ $\frac{42}{49}$ $\frac{35}{42}$

$\frac{5}{7} = \frac{}{21}$ $\frac{}{35}$ $\frac{}{56}$ $\frac{}{28}$ $\frac{}{70}$ $\frac{}{63}$ $\frac{}{49}$ $\frac{}{42}$ $\frac{}{84}$

Change to improper fractions:

$4\frac{3}{7}$ $3\frac{5}{7}$ $8\frac{2}{7}$ $9\frac{5}{7}$ $6\frac{6}{7}$ $7\frac{5}{7}$ $5\frac{3}{7}$ $9\frac{6}{7}$ $10\frac{4}{7}$

Change to whole or mixed numbers:

$\frac{49}{7}$ $\frac{54}{7}$ $\frac{52}{7}$ $\frac{56}{7}$ $\frac{60}{7}$ $\frac{62}{7}$ $\frac{63}{7}$ $\frac{64}{7}$ $\frac{66}{7}$ $\frac{69}{7}$

Multiply by 8: 6, 3, 0, 9, 8, 5, 4, 7, 2

8)16 48 24 40 56 8 72 32

Mental 30

1. 8 times 0 = (?) .
2. The product of 70 and 8 is (?) .
3. Change $\frac{64}{7}$ to a mixed number.
4. 65 decreased by 7 is (?) .
5. Which of the following fractions is improper? $\frac{3}{8}$ $\frac{7}{12}$ $\frac{8}{8}$ $\frac{5}{6}$ $\frac{3}{4}$

Drill 31

Reduce: $\frac{8}{16}$ $\frac{8}{32}$ $\frac{8}{64}$ $\frac{8}{72}$ $\frac{8}{56}$ $\frac{8}{24}$ $\frac{8}{40}$ $\frac{8}{48}$

$\frac{1}{8} = \frac{}{16}$ $\frac{}{32}$ $\frac{}{40}$ $\frac{}{72}$ $\frac{}{48}$ $\frac{}{64}$ $\frac{}{56}$ $\frac{}{80}$

Change to improper fractions:

$6\frac{1}{8}$ $5\frac{3}{8}$ $3\frac{5}{8}$ $4\frac{3}{8}$ $2\frac{7}{8}$ $9\frac{1}{8}$ $7\frac{1}{8}$ $8\frac{1}{8}$

Change to whole or mixed numbers:

$\frac{24}{8}$	$\frac{27}{8}$	$\frac{29}{8}$	$\frac{32}{8}$	$\frac{35}{8}$	$\frac{37}{8}$	$\frac{40}{8}$	$\frac{41}{8}$	$\frac{43}{8}$	$\frac{45}{8}$
8)48	49	51	54	57	58	64	65	67	68
8)69	71	72	73	75	78	76	77	79	74

Mental 31

1. Write in figures: eight hundred sixty-two thousand, four.
2. When one factor of 56 is 8, what is the other factor?
3. Is the fraction $\frac{8}{9}$ proper or improper?
4. Change $\frac{43}{8}$ to a mixed number.
5. $\frac{3}{8} = \frac{}{32}$

Drill 32

Reduce: $\frac{16}{24}$ $\frac{16}{40}$ $\frac{24}{56}$ $\frac{32}{40}$ $\frac{32}{72}$ $\frac{24}{64}$ $\frac{40}{48}$ $\frac{8}{32}$

$\frac{3}{8} = \frac{}{32}$ $\frac{}{64}$ $\frac{}{72}$ $\frac{}{56}$ $\frac{}{24}$ $\frac{}{48}$ $\frac{}{40}$ $\frac{}{80}$

Change to improper fractions:

$3\frac{1}{8}$ $4\frac{5}{8}$ $2\frac{5}{8}$ $7\frac{3}{8}$ $6\frac{3}{8}$ $9\frac{3}{8}$ $10\frac{5}{8}$ $5\frac{7}{8}$

Change to whole or mixed numbers:

$\frac{40}{8}$	$\frac{45}{8}$	$\frac{47}{8}$	$\frac{48}{8}$	$\frac{50}{8}$	$\frac{51}{8}$	$\frac{53}{8}$	$\frac{55}{8}$	$\frac{56}{8}$	$\frac{57}{8}$
8)56	58	59	60	61	62	63	65	67	69
8)71	68	72	73	75	76	74	78	77	79

Mental 32

1. How many feet are there in 8 yd.?
2. Change $5\frac{3}{8}$ to an improper fraction.
3. At 50 m.p.h. how far can a train go in 8 hours?
4. At 8 cents each, how many balls can be bought for 56 cents?
5. Estimate the cost of 8 books at $.49 each.

Drill 33

Reduce: $\frac{32}{40}$ $\frac{24}{72}$ $\frac{16}{32}$ $\frac{40}{48}$ $\frac{48}{56}$ $\frac{24}{64}$ $\frac{40}{72}$ $\frac{64}{80}$

$\frac{5}{8} = \frac{}{16}$ $\frac{}{32}$ $\frac{}{24}$ $\frac{}{40}$ $\frac{}{56}$ $\frac{}{48}$ $\frac{}{64}$ $\frac{}{72}$

Change to improper fractions:

$8\frac{3}{4}$ $8\frac{1}{6}$ $8\frac{3}{8}$ $8\frac{1}{9}$ $8\frac{4}{5}$ $8\frac{2}{7}$ $8\frac{2}{3}$ $8\frac{3}{10}$

Change to whole or mixed numbers:

$\frac{56}{8}$	$\frac{57}{8}$	$\frac{61}{8}$	$\frac{59}{8}$	$\frac{63}{8}$	$\frac{64}{8}$	$\frac{65}{8}$	$\frac{67}{8}$	$\frac{69}{8}$	$\frac{71}{8}$
8)64	66	65	68	70	72	73	75	74	76
8)72	73	75	77	79	76	74	78	64	66

Mental 33

1. 26 inches is how much more than 2 feet?
2. 18 is how many less than 2 dozen?
3. Write XCVIII in Arabic numbers.
4. How much smaller than $\frac{7}{8}$ of a pie is $\frac{3}{8}$ of a pie?
5. Which of the following fractions is not in its lowest terms? $\frac{7}{8}$ $\frac{5}{9}$ $\frac{6}{9}$ $\frac{8}{11}$

Drill 34

Reduce: $\frac{16}{40}$ $\frac{40}{48}$ $\frac{48}{56}$ $\frac{56}{64}$ $\frac{64}{72}$ $\frac{24}{56}$ $\frac{32}{72}$ $\frac{24}{32}$ $\frac{56}{72}$

$\frac{7}{8} = \frac{}{32}$ $\frac{}{24}$ $\frac{}{16}$ $\frac{}{40}$ $\frac{}{56}$ $\frac{}{72}$ $\frac{}{64}$ $\frac{}{48}$ $\frac{}{80}$

Change to improper fractions:

$8\frac{4}{5}$ $8\frac{4}{7}$ $8\frac{3}{4}$ $8\frac{5}{6}$ $8\frac{7}{8}$ $8\frac{5}{9}$ $8\frac{7}{10}$ $8\frac{1}{12}$

Change to whole or mixed numbers:

$\frac{72}{8}$	$\frac{73}{8}$	$\frac{75}{8}$	$\frac{77}{8}$	$\frac{79}{8}$	$\frac{64}{8}$	$\frac{65}{8}$	$\frac{67}{8}$	$\frac{56}{8}$	$\frac{59}{8}$
8)72	75	74	76	78	77	64	66	68	70

XL XLII XLV XLVI XLIX

Mental 34

1. How many inches are there in 8 feet?
2. At 8 cents a yard, how many yards of ribbon can be bought for 80 cents?
3. Write in figures: three million, four hundred eighteen thousand, two hundred one.
4. Which of the following fractions is not in its lowest terms? $\frac{8}{17}$ $\frac{9}{35}$ $\frac{14}{35}$ $\frac{15}{34}$
5. $\frac{7}{8} = \frac{}{72}$

Drill 35

$\frac{1}{3}+\frac{1}{3}$ $\frac{1}{5}+\frac{1}{5}$ $\frac{1}{9}+\frac{4}{9}$ $\frac{2}{7}+\frac{4}{7}$ $\frac{3}{5}+\frac{1}{5}$

$\frac{2}{3}-\frac{1}{3}$ $\frac{4}{5}-\frac{1}{5}$ $\frac{8}{9}-\frac{1}{9}$ $\frac{7}{9}-\frac{2}{9}$ $\frac{5}{7}-\frac{2}{7}$

Multiply by 9: 3, 2, 0, 1, 7, 6, 5, 4, 8, 9

9)	18	27	36	0	54	63	45	72	81	90
9)	9	10	11	18	20	19	27	29	28	30
1 =	$\frac{}{8}$	$\frac{}{7}$	$\frac{}{6}$	$\frac{}{4}$	$\frac{}{9}$	$\frac{}{10}$	$\frac{}{3}$	$\frac{}{5}$	$\frac{}{12}$	
	XC	XCIII	XCIV	XCVIII	XCIX					

Mental 35

1. How many feet are there in 9 yards?
2. $\frac{3}{5}+\frac{1}{5}=$?
3. $\frac{5}{9}-\frac{2}{9}=$?
4. If a ship sails 180 mi. in 9 hr. what is the average speed per hr.?
5. What is the cost of 20 cords of wood at $9 a cord?

Drill 36

$\frac{1}{3}+\frac{2}{3}$ $\frac{2}{5}+\frac{3}{5}$ $\frac{4}{9}+\frac{5}{9}$ $\frac{4}{7}+\frac{2}{7}$ $\frac{4}{7}+\frac{3}{7}$

$\frac{4}{5}-\frac{1}{5}$ $\frac{3}{7}-\frac{2}{7}$ $\frac{5}{9}-\frac{4}{9}$ $\frac{6}{7}-\frac{4}{7}$ $\frac{3}{3}-\frac{1}{3}$

Reduce: $\frac{9}{18}$ $\frac{9}{27}$ $\frac{9}{45}$ $\frac{9}{36}$ $\frac{9}{54}$ $\frac{9}{72}$ $\frac{9}{63}$ $\frac{9}{90}$ $\frac{9}{81}$

$\frac{1}{9}=\frac{}{27}$ $\frac{}{36}$ $\frac{}{18}$ $\frac{}{81}$ $\frac{}{45}$ $\frac{}{63}$ $\frac{}{72}$ $\frac{}{54}$

Change to improper fractions:

$2\frac{2}{9}$ $3\frac{4}{9}$ $4\frac{2}{9}$ $5\frac{7}{9}$ $7\frac{1}{9}$ $6\frac{4}{9}$ $8\frac{1}{9}$ $9\frac{1}{9}$

9)	27	29	30	31	36	38	40	42	45	47

Mental 36

1. If the cost of 9 chairs is $54, what is the price per chair?
2. Three-fifths plus one-fifth equals (?).
3. Write in figures: two hundred seven thousand six hundred three.
4. Write XCIV in Arabic numbers.
5. $\frac{5}{8}-\frac{3}{8}=$?

Drill 37

$\frac{3}{8}+\frac{5}{8}$ $\frac{3}{8}+\frac{1}{8}$ $\frac{5}{8}+\frac{1}{8}$ $\frac{5}{6}+\frac{1}{6}$ $\frac{4}{9}+\frac{2}{9}$

$\frac{5}{8}-\frac{1}{8}$ $\frac{5}{8}-\frac{3}{8}$ $\frac{5}{6}-\frac{1}{6}$ $\frac{3}{4}-\frac{1}{4}$ $\frac{4}{9}-\frac{1}{9}$

Reduce: $\frac{18}{27}$ $\frac{27}{36}$ $\frac{36}{45}$ $\frac{45}{54}$ $\frac{54}{63}$ $\frac{63}{72}$ $\frac{72}{81}$ $\frac{81}{90}$ $\frac{27}{63}$

$\frac{2}{9}=\frac{}{45}$ $\frac{}{36}$ $\frac{}{63}$ $\frac{}{72}$ $\frac{}{81}$ $\frac{}{54}$ $\frac{}{18}$ $\frac{}{27}$ $\frac{}{90}$

Change to whole or mixed numbers:

$\frac{18}{9}$ $\frac{20}{9}$ $\frac{24}{9}$ $\frac{27}{9}$ $\frac{29}{9}$ $\frac{31}{9}$ $\frac{32}{9}$ $\frac{34}{9}$ $\frac{35}{9}$

9)	45	47	46	49	51	50	54	56	58	60

Mental 37

1. Which is more and by how much: 24 ft. or 9 yd.?
2. There are (?) days in 9 weeks.
3. At 9¢ a yard, how much will 30 feet of ribbon cost?
4. Gerald bought 9 three-cent stamps. What was his change from 30¢?
5. Which is more and by how much: 20 things or 2 dozen?

Drill 38

$\frac{6}{7}+\frac{1}{7}$ $\frac{5}{12}+\frac{1}{12}$ $\frac{9}{10}+\frac{1}{10}$ $\frac{7}{10}+\frac{1}{10}$ $\frac{3}{10}+\frac{7}{10}$

$\frac{7}{10}-\frac{1}{10}$ $\frac{9}{10}-\frac{3}{10}$ $\frac{7}{10}-\frac{5}{10}$ $\frac{5}{9}-\frac{2}{9}$ $\frac{7}{9}-\frac{1}{9}$

$\frac{4}{9}=\frac{}{63}$ $\frac{}{45}$ $\frac{}{81}$ $\frac{}{72}$ $\frac{}{36}$ $\frac{}{27}$ $\frac{}{54}$ $\frac{}{18}$ $\frac{}{90}$

Change to whole or mixed numbers:

$\frac{36}{9}$ $\frac{37}{9}$ $\frac{40}{9}$ $\frac{41}{9}$ $\frac{43}{9}$ $\frac{45}{9}$ $\frac{46}{9}$ $\frac{49}{9}$ $\frac{50}{9}$ $\frac{52}{9}$

Change to improper fractions:

$2\frac{1}{9}$ $3\frac{4}{9}$ $5\frac{2}{9}$ $8\frac{1}{9}$ $9\frac{4}{9}$ $7\frac{1}{9}$ $4\frac{4}{9}$ $6\frac{5}{9}$

Mental 38

1. $\frac{5}{8}+\frac{3}{8}=$?
2. Change $\frac{46}{9}$ to a mixed number.
3. At $.20 an hour, how much can Roy earn in 9 hr.?
4. There are (?) minutes in 9 hours.
5. $\frac{1}{9}$ of 54 feet equals (?) yards?

Drill 39

$\frac{7}{12}+\frac{5}{12}$ $\frac{11}{12}+\frac{1}{12}$ $\frac{5}{12}+\frac{1}{12}$ $\frac{3}{10}+\frac{1}{10}$ $\frac{1}{8}+\frac{1}{8}$

$\frac{8}{9}-\frac{2}{9}$ $\frac{7}{9}-\frac{4}{9}$ $\frac{4}{9}-\frac{1}{9}$ $\frac{7}{8}-\frac{1}{8}$ $\frac{7}{8}-\frac{3}{8}$

Reduce: $\frac{36}{45}$ $\frac{45}{54}$ $\frac{54}{63}$ $\frac{63}{72}$ $\frac{18}{63}$ $\frac{45}{81}$ $\frac{63}{81}$ $\frac{54}{72}$ $\frac{27}{45}$

$\frac{5}{9}=\frac{}{45}$ $\frac{}{18}$ $\frac{}{27}$ $\frac{}{81}$ $\frac{}{54}$ $\frac{}{63}$ $\frac{}{36}$ $\frac{}{72}$ $\frac{}{90}$

Change to improper fractions:

$9\frac{1}{2}$ $9\frac{3}{4}$ $9\frac{1}{8}$ $9\frac{4}{7}$ $9\frac{4}{5}$ $9\frac{1}{6}$ $9\frac{2}{9}$ $9\frac{2}{3}$

9)63 64 65 67 69 71 72 73 74 76

Mental 39

1. $\frac{5}{12}+\frac{7}{12}=$ ..... ?
2. In our class we have 3 hr. in the morning and $2\frac{1}{2}$ hr. in the afternoon. How many hours of class have we in a day?
3. There are ..... (?) ..... inches in a yard.
4. Reduce $\frac{18}{72}$ to its lowest terms.
5. $\frac{5}{9}=\frac{}{63}$

Drill 40

$\frac{5}{8}+\frac{1}{8}$ $\frac{3}{4}-\frac{1}{4}$ $\frac{2}{9}+\frac{1}{9}$ $\frac{7}{12}-\frac{1}{12}$ $\frac{11}{12}+\frac{1}{12}$

$\frac{7}{9}=\frac{}{36}$ $\frac{}{63}$ $\frac{}{27}$ $\frac{}{72}$ $\frac{}{81}$ $\frac{}{18}$ $\frac{}{45}$ $\frac{}{54}$ $\frac{}{90}$

Change to whole or mixed numbers:

$\frac{54}{9}$ $\frac{55}{9}$ $\frac{56}{9}$ $\frac{58}{9}$ $\frac{59}{9}$ $\frac{61}{9}$ $\frac{63}{9}$ $\frac{64}{9}$ $\frac{65}{9}$ $\frac{67}{9}$

Change to improper fractions:

$9\frac{3}{8}$ $9\frac{1}{4}$ $9\frac{1}{3}$ $9\frac{5}{6}$ $9\frac{3}{5}$ $9\frac{5}{7}$ $9\frac{4}{9}$ $9\frac{1}{2}$

9)72 73 74 75 77 76 78 79 81 82

Mental 40

1. Bob had $\frac{3}{4}$ of a pie. He ate $\frac{1}{4}$. What part of the pie was left?
2. How much less than $\frac{5}{9}$ is $\frac{2}{9}$?
3. Change $9\frac{3}{7}$ to an improper fraction.
4. How much more will 9 four-cent apples cost than 4 eight-cent oranges?
5. At 90 cents a pound, how much will 8 ounces of candy cost?

Drill 41

$\frac{5}{6}-\frac{1}{6}$ $\frac{7}{16}+\frac{9}{16}$ $\frac{9}{16}-\frac{1}{16}$ $\frac{3}{18}+\frac{5}{18}$ $\frac{7}{18}-\frac{1}{18}$

Reduce: $\frac{36}{45}$ $\frac{27}{36}$ $\frac{45}{54}$ $\frac{54}{63}$ $\frac{63}{72}$ $\frac{72}{81}$ $\frac{81}{90}$ $\frac{63}{90}$

Change to whole or mixed numbers:

$\frac{63}{9}$ $\frac{64}{9}$ $\frac{67}{9}$ $\frac{70}{9}$ $\frac{72}{9}$ $\frac{73}{9}$ $\frac{76}{9}$ $\frac{74}{9}$ $\frac{77}{9}$ $\frac{79}{9}$

Change to improper fractions:

$8\frac{1}{9}$ $4\frac{5}{9}$ $6\frac{2}{9}$ $3\frac{7}{9}$ $9\frac{4}{9}$ $7\frac{5}{9}$ $5\frac{4}{9}$ $2\frac{8}{9}$

9)72 75 81 83 85 82 87 89 88 86

Mental 41

1. David had 45¢. He spent 15¢ at the movies and 10¢ for ice cream. How much had he left?
2. Mary Ellen had $\frac{5}{6}$ yd. of silk. She used $\frac{1}{6}$ yd. for a doll's dress. How much had she left?
3. At $9 each how many blankets can a dealer buy for $72?
4. Write XCIII in Arabic numbers.
5. Change $\frac{74}{9}$ to a mixed number.

Drill 42

$\frac{1}{2}+\frac{1}{2}$ $\frac{1}{2}-\frac{1}{2}$ $\frac{1}{4}+\frac{1}{4}$ $\frac{1}{4}-\frac{1}{4}$ $\frac{2}{3}-\frac{2}{3}$

$\frac{8}{9}=\frac{}{27}$ $\frac{}{36}$ $\frac{}{54}$ $\frac{}{72}$ $\frac{}{45}$ $\frac{}{63}$ $\frac{}{81}$ $\frac{}{90}$ $\frac{}{18}$

Change to whole or mixed numbers:

$\frac{72}{9}$ $\frac{76}{9}$ $\frac{79}{9}$ $\frac{80}{9}$ $\frac{81}{9}$ $\frac{82}{9}$ $\frac{83}{9}$ $\frac{85}{9}$ $\frac{88}{9}$ $\frac{89}{9}$

Change to improper fractions:

$9\frac{1}{2}$ $9\frac{3}{4}$ $9\frac{5}{6}$ $9\frac{2}{9}$ $9\frac{3}{7}$ $9\frac{7}{10}$ $9\frac{3}{5}$ $9\frac{5}{8}$ $9\frac{2}{3}$

9)63 66 69 72 76 81 85 83 87 84

Mental 42

1. At $9 per day, how many days must a man work to earn $540?
2. How many yards of cloth are there in two remnants, one of which contains $\frac{5}{8}$ yd. and the other $\frac{3}{8}$ yd.?
3. John weighed $62\frac{1}{2}$ pounds. How much did he weigh after losing $\frac{1}{2}$ lb.?
4. Reduce $\frac{36}{72}$ to its lowest terms.
5. Estimate the cost of 9 books at $1.90 each.

Drill 43

Add 9 to: 7, 4, 6, 8, 9, 0, 3, 5, 2

Take 9 from: 9, 17, 18, 11, 15, 14, 12, 13, 16

$\frac{3}{8}+\frac{3}{8}$ $\frac{3}{8}-\frac{3}{8}$ $\frac{6}{7}+\frac{1}{7}$ $\frac{3}{5}-\frac{3}{5}$ $\frac{9}{10}-\frac{1}{10}$

$\frac{2}{3}=\frac{}{9}$ $\frac{}{27}$ $\frac{}{30}$ $\frac{}{36}$ $\frac{}{24}$ $\frac{}{18}$ $\frac{}{12}$ $\frac{}{15}$ $\frac{}{21}$

Reduce: $\frac{3}{9}$ $\frac{3}{18}$ $\frac{24}{27}$ $\frac{27}{30}$ $\frac{21}{27}$ $\frac{6}{9}$ $\frac{27}{30}$ $\frac{15}{24}$

Change to improper fractions:

$3\frac{1}{9}$ $3\frac{4}{5}$ $3\frac{7}{8}$ $3\frac{5}{7}$ $3\frac{7}{10}$ $3\frac{5}{6}$ $3\frac{3}{4}$ $3\frac{5}{12}$

Mental 43

1. How much less than 3 feet are 30 inches?
2. Change $3\frac{7}{8}$ to an improper fraction.
3. Write in figures: nine hundred six thousand, five hundred two.
4. Margaret used $1\frac{3}{4}$ cupfuls of flour for a cake and $2\frac{1}{4}$ cupfuls for another cake. How much flour did she use for both cakes?
5. What number is 9 less than 16?

Drill 44

Add 8 to: 7, 6, 8, 0, 9, 5, 4, 3, 2

Take 8 from: 12, 17, 15, 13, 11, 16, 10, 14, 21

$\frac{7}{12}-\frac{5}{12}$ $\frac{7}{12}+\frac{5}{12}$ $\frac{8}{9}-\frac{2}{9}$ $\frac{4}{5}-\frac{4}{5}$ $\frac{3}{7}+\frac{4}{7}$

$\frac{3}{4}=\frac{}{16}$ $\frac{}{24}$ $\frac{}{36}$ $\frac{}{8}$ $\frac{}{12}$ $\frac{}{32}$ $\frac{}{28}$ $\frac{}{20}$ $\frac{}{40}$

Reduce: $\frac{4}{16}$ $\frac{16}{20}$ $\frac{20}{28}$ $\frac{28}{36}$ $\frac{36}{40}$ $\frac{24}{28}$ $\frac{28}{32}$ $\frac{32}{36}$

Change to mixed numbers:

$\frac{13}{4}$ $\frac{19}{4}$ $\frac{17}{4}$ $\frac{21}{4}$ $\frac{25}{4}$ $\frac{29}{4}$ $\frac{31}{4}$ $\frac{35}{4}$ $\frac{39}{4}$ $\frac{37}{4}$

Mental 44

1. Which is more and by how much: 2 bushels or 18 pecks?
2. Which is more and by how much: 20 inches or 2 feet?
3. Write in figures: four hundred fifty-seven thousand, three hundred four.
4. Estimate the cost of 9 coats at $49.75 each.
5. $\frac{4}{5}=\frac{}{45}$

Drill 45

Add 7 to: 8, 3, 5, 9, 4, 0, 7, 6, 17, 16

Take 7 from:

11, 15, 16, 13, 12, 10, 14, 20, 25, 24

$\frac{3}{20}+\frac{1}{20}$ $\frac{7}{20}-\frac{3}{20}$ $\frac{9}{20}+\frac{11}{20}$ $\frac{11}{20}-\frac{1}{20}$

$\frac{4}{5}=\frac{}{10}$ $\frac{}{20}$ $\frac{}{15}$ $\frac{}{45}$ $\frac{}{40}$ $\frac{}{30}$ $\frac{}{35}$ $\frac{}{50}$ $\frac{}{25}$

Reduce: $\frac{5}{20}$ $\frac{15}{25}$ $\frac{20}{30}$ $\frac{10}{45}$ $\frac{40}{45}$ $\frac{35}{40}$ $\frac{45}{50}$ $\frac{10}{15}$

Change to improper fractions:

$5\frac{4}{5}$ $5\frac{2}{9}$ $5\frac{6}{7}$ $8\frac{4}{5}$ $6\frac{3}{5}$ $5\frac{3}{4}$ $5\frac{7}{10}$ $3\frac{4}{5}$

Mental 45

1. 25 decreased by 7 equals ...(?)....
2. Reduce $\frac{45}{50}$ to its lowest terms.
3. $\frac{7}{20}-\frac{3}{20}=$ ...(?)....
4. A house rents for $600 a year. What is the rent for one month?
5. Which is more and by how much: 40 inches or 1 yard?

Drill 46

Add 6 to: 5, 7, 9, 8, 0, 4, 15, 18, 17

Take 6 from: 12, 15, 10, 13, 14, 25, 23, 24

Multiply by 6: 8, 4, 3, 0, 5, 9, 2, 7, 6

$\frac{5}{6}=\frac{}{12}$ $\frac{}{24}$ $\frac{}{36}$ $\frac{}{18}$ $\frac{}{54}$ $\frac{}{42}$ $\frac{}{60}$ $\frac{}{48}$ $\frac{}{30}$

Reduce: $\frac{6}{18}$ $\frac{12}{18}$ $\frac{18}{24}$ $\frac{24}{30}$ $\frac{30}{36}$ $\frac{36}{42}$ $\frac{42}{48}$ $\frac{48}{54}$

Change to mixed numbers:

$\frac{19}{6}$ $\frac{25}{6}$ $\frac{29}{6}$ $\frac{31}{6}$ $\frac{35}{6}$ $\frac{43}{6}$ $\frac{37}{6}$ $\frac{41}{6}$ $\frac{44}{6}$ $\frac{49}{6}$

Mental 46

1. How much larger than $\frac{1}{4}$ of a pie is $\frac{3}{4}$ of the same pie?
2. Write LXXVIII in Arabic numbers.
3. Change $\frac{41}{6}$ to a mixed number.
4. Which of the following fractions is proper?
   $\frac{7}{5}$ $\frac{9}{4}$ $\frac{9}{8}$ $\frac{5}{6}$ $\frac{6}{6}$
5. What is the sum of $\frac{9}{20}$ and $\frac{1}{20}$?

Drill 47

$\frac{7}{18}-\frac{7}{18}$ $\frac{7}{18}-\frac{1}{18}$ $\frac{5}{18}+\frac{13}{18}$ $\frac{1}{18}+\frac{5}{18}$ $\frac{11}{18}-\frac{1}{18}$

Multiply by 6: 3, 5, 0, 9, 8, 12, 7, 6, 4, 2

Change to improper fractions:

$6\frac{3}{5}$ $6\frac{7}{8}$ $6\frac{5}{9}$ $6\frac{3}{10}$ $6\frac{3}{7}$ $3\frac{5}{6}$ $4\frac{1}{6}$ $6\frac{5}{6}$

Change to mixed numbers:

$\frac{25}{6}$ $\frac{31}{6}$ $\frac{29}{6}$ $\frac{37}{6}$ $\frac{41}{6}$ $\frac{43}{6}$ $\frac{49}{6}$ $\frac{55}{6}$ $\frac{53}{6}$ $\frac{59}{6}$

CXX CXIV CXVI CXIX CXXI

Mental 47

1. What is the common denominator of $\frac{1}{3}$ and $\frac{1}{6}$?
2. Estimate the cost of 6 chairs at $9.95 each.
3. Write in figures: seven million, eight hundred four thousand, five.
4. Change $6\frac{4}{7}$ to an improper fraction.
5. How many feet are there in 6 yards?

Drill 48

$\frac{9}{10}-\frac{1}{10}$ $\frac{1}{10}+\frac{1}{10}$ $\frac{7}{10}+\frac{3}{10}$ $\frac{3}{10}-\frac{3}{10}$ $\frac{7}{10}-\frac{3}{10}$

Multiply by 6: 8, 5, 0, 7, 9, 1, 4, 12, 10, 3

Change to whole or mixed numbers:

$\frac{35}{6}$ $\frac{36}{6}$ $\frac{41}{6}$ $\frac{42}{6}$ $\frac{54}{6}$ $\frac{55}{6}$ $\frac{59}{6}$ $\frac{48}{6}$ $\frac{53}{6}$ $\frac{49}{6}$

Change to improper fractions:

$3\frac{5}{6}$ $8\frac{1}{6}$ $5\frac{5}{6}$ $6\frac{1}{6}$ $6\frac{5}{9}$ $6\frac{6}{7}$ $6\frac{7}{10}$ $4\frac{5}{6}$

D CD DC DCC DCCC

Mental 48

1. To change feet to yards we (?) the number of feet by (?).
2. $5\frac{1}{2}$ yd. $-2\frac{1}{2}$ yd. = (?) yd.
3. Write CXIX in Arabic numbers.
4. What is the sum of $\frac{7}{10}$ and $\frac{3}{10}$?
5. Write in figures: four million, seven hundred thirty-four thousand, nine hundred seventy-eight.

Drill 49

Add 5 to: 7, 9, 5, 12, 14, 8, 6, 0, 11

$1=\frac{}{10}$ $\frac{}{9}$ $\frac{}{8}$ $\frac{}{12}$ $\frac{}{20}$ $\frac{}{15}$ $\frac{}{7}$ $\frac{}{24}$ $\frac{}{18}$ $\frac{}{16}$

$\frac{4}{15}+\frac{1}{15}$ $\frac{4}{15}-\frac{1}{15}$ $\frac{1}{15}+\frac{11}{15}$ $\frac{11}{15}-\frac{1}{15}$ $1-\frac{7}{10}$

Reduce: $\frac{6}{24}$ $\frac{6}{54}$ $\frac{12}{18}$ $\frac{30}{36}$ $\frac{36}{42}$ $\frac{42}{54}$ $\frac{48}{54}$ $\frac{42}{48}$

Change to whole or mixed numbers:

$\frac{30}{6}$ $\frac{35}{6}$ $\frac{25}{6}$ $\frac{29}{6}$ $\frac{48}{6}$ $\frac{49}{6}$ $\frac{54}{6}$ $\frac{59}{6}$ $\frac{41}{6}$ $\frac{43}{6}$

$1\frac{1}{6}=\frac{}{6}$ $2\frac{5}{6}=1\frac{}{6}$ $1\frac{1}{3}=\frac{}{3}$ $3\frac{2}{5}=2\frac{}{5}$ $5\frac{3}{7}=4\frac{}{7}$

Mental 49

1. $1-\frac{7}{10}$ equals (?).
2. In one rod there are (?) yards.
3. To change inches to yards we (?) the number of inches by (?).
4. Write CCCVII in Arabic numbers.
5. $2\frac{5}{6}=1\frac{}{6}$

Drill 50

Take 5 from: 12, 14, 11, 10, 13, 19, 17, 18

$1-\frac{3}{5}$ $1-\frac{4}{9}$ $1-\frac{6}{7}$ $1-\frac{3}{8}$ $1-\frac{7}{10}$

$1\frac{3}{8}=\frac{}{8}$ $2\frac{5}{7}=1\frac{}{7}$ $3\frac{5}{9}=2\frac{}{9}$ $6\frac{7}{10}=5\frac{}{10}$

Multiply by 7: 3, 4, 6, 0, 9, 2, 8, 7, 5, 1

Change to improper fractions:

$3\frac{4}{7}$ $2\frac{5}{7}$ $1\frac{6}{7}$ $4\frac{3}{7}$ $6\frac{2}{7}$ $8\frac{4}{7}$ $9\frac{1}{7}$ $5\frac{4}{7}$

CD DCX DCCC DXC DCXV

Mental 50

1. Which is more and by how much: 2 ft. or 26 inches?
2. $6\frac{2}{7}=5\frac{}{7}$
3. I am used to measure wire. There are 3 of me in a yard. What am I?
4. $\frac{1}{2}+\frac{2}{6}$ equals (?).
5. When one of the factors of 35 is 7, what is the other factor?

Drill 51

Add 4 to: 7, 9, 6, 8, 15, 13, 0, 14

$2 = 1\frac{}{8}$ $2 = 1\frac{}{6}$ $2 = 1\frac{}{4}$ $2 = 1\frac{}{8}$ $2 = 1\frac{}{9}$

$2 - \frac{3}{8}$ $2 - \frac{5}{6}$ $2 - \frac{3}{4}$ $2 - \frac{7}{8}$ $2 - \frac{4}{9}$

Multiply by 7: 3, 0, 9, 8, 10, 6, 5, 7, 1, 12

$\frac{4}{7} = \frac{}{14}$ $\frac{}{28}$ $\frac{}{35}$ $\frac{}{21}$ $\frac{}{70}$ $\frac{}{63}$ $\frac{}{42}$ $\frac{}{56}$ $\frac{}{84}$

Change to whole or mixed numbers:

$\frac{28}{7}$ $\frac{29}{7}$ $\frac{32}{7}$ $\frac{34}{7}$ $\frac{35}{7}$ $\frac{37}{7}$ $\frac{39}{7}$ $\frac{41}{7}$ $\frac{44}{7}$ $\frac{46}{7}$

Mental 51

1. At the speed of 7 miles per hour how long will it take a boat to go 154 miles?
2. If the length of a rug is 21 feet, what is the length in yards?
3. At \$.40 each find the cost of 7 neckties.
4. There are (?) rods in a mile.
5. $2 - \frac{4}{9} =$?

Drill 52

Take 4 from: 11, 13, 10, 12, 19, 16, 18, 15

$1 - \frac{5}{12}$ $2 - \frac{7}{10}$ $1 - \frac{9}{10}$ $2 - \frac{15}{16}$ $1 - \frac{3}{5}$

$3\frac{1}{4} = 2\frac{}{4}$ $5\frac{3}{10} = 4\frac{}{10}$ $7\frac{5}{8} = 6\frac{}{8}$ $6\frac{7}{12} = 5\frac{}{12}$

Multiply by 7: 8, 5, 0, 6, 9, 4, 1, 12, 11, 7

$\frac{3}{7} = \frac{}{21}$ $\frac{}{35}$ $\frac{}{42}$ $\frac{}{56}$ $\frac{}{63}$ $\frac{}{84}$ $\frac{}{49}$ $\frac{}{14}$

Change to improper fractions:

$7\frac{3}{7}$ $8\frac{4}{7}$ $5\frac{6}{7}$ $9\frac{3}{7}$ $6\frac{2}{7}$ $4\frac{3}{7}$ $10\frac{5}{7}$ $3\frac{6}{7}$

Mental 52

1. There are 84 inches in 7 feet. How many inches are there in two feet?
2. From 2 take $\frac{7}{10}$
3. If a man had 120 eggs he would have (?) dozen.
4. Write in figures: seven million, six hundred thousand forty-three.
5. $\frac{1}{4}$ of a pound = (?) ounces.

Drill 53

$3 + \frac{5}{6}$ $4 + \frac{7}{8}$ $1\frac{1}{2} + \frac{1}{2}$ $1\frac{1}{2} - \frac{1}{2}$ $1\frac{7}{8} - \frac{3}{8}$

$2\frac{5}{8} = 1\frac{}{8}$ $3\frac{7}{10} = 2\frac{}{10}$ $4\frac{1}{6} = 3\frac{}{6}$ $8\frac{3}{4} = 7\frac{}{4}$

Multiply by 7: 6, 0, 1, 8, 5, 9, 7, 3, 12

$\frac{5}{7} = \frac{}{28}$ $\frac{}{42}$ $\frac{}{56}$ $\frac{}{49}$ $\frac{}{63}$ $\frac{}{70}$ $\frac{}{35}$ $\frac{}{84}$

Change to whole or mixed numbers:

$\frac{18}{7}$ $\frac{35}{7}$ $\frac{40}{7}$ $\frac{42}{7}$ $\frac{45}{7}$ $\frac{47}{7}$ $\frac{49}{7}$ $\frac{52}{7}$ $\frac{56}{7}$ $\frac{57}{7}$

M MD MCD MDC MDCC

Mental 53

1. One week John earned \$1.50. This was 50¢ less than he earned the week before. How much did he earn the week before?
2. $\frac{1}{5} - \frac{1}{10}$ equals (?).
3. $3\frac{5}{7} + 2\frac{2}{7}$ equals (?).
4. Write LXVII in Arabic numbers.
5. $7\frac{3}{5} = 6\frac{}{5}$

Drill 54

Add 9 to: 8, 7, 5, 9, 4, 6, 0, 3, 2

Take 9 from: 12, 20, 16, 13, 14, 18, 11, 17, 15

$1\frac{3}{8} + \frac{5}{8}$ $\frac{6}{7} + 1\frac{1}{7}$ $\frac{8}{9} + 1\frac{1}{9}$ $1\frac{4}{5} + \frac{1}{5}$

$3\frac{2}{7} = 2\frac{}{7}$ $4\frac{5}{8} = 3\frac{}{8}$ $5\frac{4}{9} = 4\frac{}{9}$ $7\frac{3}{5} = 6\frac{}{5}$

$\frac{6}{7} = \frac{}{28}$ $\frac{}{56}$ $\frac{}{42}$ $\frac{}{63}$ $\frac{}{70}$ $\frac{}{49}$ $\frac{}{84}$ $\frac{}{35}$

Change to improper fractions:

$7\frac{4}{9}$ $7\frac{3}{8}$ $7\frac{5}{6}$ $7\frac{3}{4}$ $7\frac{3}{10}$ $7\frac{1}{12}$ $7\frac{2}{7}$ $7\frac{4}{5}$ $7\frac{2}{3}$ $7\frac{1}{11}$

Mental 54

1. Write LXX in Arabic numbers.
2. What is the sum of $1\frac{3}{8}$ and $\frac{5}{8}$?
3. If an airplane travels at the rate of 180 m.p.h. how far does it go in 30 min.?
4. To change yards to feet we (?) the number of yards by (?).
5. $5\frac{4}{9} = 4\frac{}{9}$

Drill 55

Multiply by 8: 3, 5, 0, 4, 1, 7, 9, 6, 8

$\frac{3}{8} = \frac{\quad}{16}$ $\frac{\quad}{24}$ $\frac{\quad}{40}$ $\frac{\quad}{56}$ $\frac{\quad}{72}$ $\frac{\quad}{64}$ $\frac{\quad}{48}$ $\frac{\quad}{32}$

Reduce: $\frac{8}{16}$ $\frac{8}{24}$ $\frac{16}{24}$ $\frac{24}{40}$ $\frac{40}{72}$ $\frac{32}{56}$ $\frac{48}{56}$ $\frac{56}{64}$

$3\frac{1}{6} = 2\frac{\quad}{6}$ $4\frac{5}{8} = 3\frac{\quad}{8}$ $6\frac{3}{10} = 5\frac{\quad}{10}$ $8\frac{2}{9} = 7\frac{\quad}{9}$

Change to improper fractions:

$5\frac{3}{8}$ $7\frac{5}{8}$ $4\frac{7}{8}$ $9\frac{1}{8}$ $6\frac{1}{8}$ $8\frac{5}{8}$ $4\frac{3}{8}$ $10\frac{7}{8}$

Mental 55

1. $4\frac{5}{8} = 3\frac{\quad}{8}$
2. John is 19 years old. Thomas is 4 years older. How old is Thomas?
3. Write in figures: seven million, five hundred eight thousand, six hundred thirty (?) .
4. Marie bought a book for \$.30. How much would 8 of those books cost?
5. A whole number and a fraction is called a (?) number.

Drill 56

Add 8 to: 7, 27, 17, 47, 57, 87, 37, 36, 77

Take 8 from: 15, 35, 55, 95, 45, 75, 65, 85, 105

Multiply by 8: 6, 0, 9, 3, 10, 12, 7, 8, 5

Reduce: $\frac{8}{24}$ $\frac{16}{40}$ $\frac{32}{56}$ $\frac{72}{80}$ $\frac{40}{64}$ $\frac{56}{72}$ $\frac{64}{72}$ $\frac{40}{48}$

$8\frac{7}{6} = 9\frac{\quad}{6}$ $6\frac{5}{3} = 7\frac{\quad}{3}$ $5\frac{9}{7} = 6\frac{\quad}{7}$ $7\frac{6}{5} = 8\frac{\quad}{5}$

$7\frac{3}{5} = 6\frac{\quad}{5}$ $8\frac{2}{9} = 7\frac{\quad}{9}$ $4\frac{5}{8} = 3\frac{\quad}{8}$ $6\frac{7}{10} = 5\frac{\quad}{10}$

MD MDC MDCC MDCCC

Mental 56

1. Jane is 17 years old. This is 8 years younger than her cousin Sue. How old is Sue?
2. $8\frac{7}{5} = 9\frac{\quad}{5}$
3. $7\frac{5}{12} = 6\frac{\quad}{12}$
4. How many quarts are there in 8 gallons?
5. If a plane travels 4 miles in one minute, how far will it go in 1 hour?

Drill 57

Add 7 to: 8, 5, 9, 6, 4, 7, 0, 13, 12

Take 7 from: 14, 11, 13, 16, 12, 15, 20, 19

Multiply by 8: 3, 8, 7, 6, 9, 11, 0, 5, 12

Change to improper fractions:

$8\frac{4}{5}$ $7\frac{5}{8}$ $6\frac{3}{8}$ $8\frac{4}{9}$ $8\frac{7}{10}$ $3\frac{5}{8}$ $8\frac{3}{4}$ $12\frac{1}{8}$

$3\frac{7}{4} = 4\frac{\quad}{4}$ $4\frac{9}{5} = 5\frac{\quad}{5}$ $6\frac{11}{9} = 7\frac{\quad}{9}$ $5\frac{9}{4} = 7\frac{\quad}{4}$

$5\frac{3}{7} = 4\frac{\quad}{7}$ $8\frac{5}{9} = 7\frac{\quad}{9}$ $6\frac{5}{12} = 5\frac{\quad}{12}$ $9\frac{1}{6} = 8\frac{\quad}{6}$

Mental 57

1. When one factor of 56 is 8, what is the other factor?
2. $3\frac{7}{4} = 4\frac{\quad}{4}$
3. $8\frac{5}{9} = 7\frac{\quad}{9}$
4. This week Anthony saved 15¢. This is 7 cents less than the amount he saved last week. What did Anthony save last week?
5. Write MDC in Arabic numbers.

Drill 58

Multiply by 9: 3, 6, 8, 0, 9, 4, 7, 5, 12, 10

$\frac{1}{9} = \frac{\quad}{18}$ $\frac{\quad}{36}$ $\frac{\quad}{72}$ $\frac{\quad}{54}$ $\frac{\quad}{90}$ $\frac{\quad}{108}$ $\frac{\quad}{63}$ $\frac{\quad}{45}$

Change to mixed numbers:

$\frac{31}{9}$ $\frac{58}{9}$ $\frac{73}{9}$ $\frac{40}{9}$ $\frac{82}{9}$ $\frac{67}{9}$ $\frac{47}{9}$ $\frac{91}{9}$ $\frac{65}{9}$

Add 8 to: 3, 6, 9, 8, 5, 0, 1, 7, 4

Take 8 from: 12, 15, 17, 13, 16, 14, 11, 10, 23

$3\frac{9}{5} = 4\frac{\quad}{5}$ $7\frac{10}{9} = 8\frac{\quad}{9}$ $5\frac{7}{4} = 6\frac{\quad}{4}$ $4\frac{9}{7} = 5\frac{\quad}{7}$

Mental 58

1. A dealer spent \$54 for 9 pairs of shoes. How much did he pay for each pair?
2. Mother used 4 yards of ribbon to make 5 bows. If the bows were all the same size, what part of a yard was used for each?
3. $4\frac{9}{7} = 5\frac{\quad}{7}$
4. $9\frac{2}{7} = 8\frac{\quad}{7}$
5. What number is 9 less than 27?

Drill 59

Multiply by 9: 8, 4, 3, 0, 5, 9, 10, 7, 1, 2

Reduce: $\frac{9}{27}$ $\frac{18}{27}$ $\frac{27}{36}$ $\frac{36}{45}$ $\frac{54}{63}$ $\frac{45}{72}$ $\frac{72}{81}$ $\frac{81}{90}$

Change to improper fractions:

$7\frac{2}{9}$ $9\frac{3}{5}$ $6\frac{4}{9}$ $9\frac{7}{10}$ $4\frac{5}{9}$ $8\frac{2}{9}$ $9\frac{2}{3}$ $1\frac{8}{9}$

How many min. in 1 hr., 2 hr., 3 hr., $\frac{1}{2}$ hr., $\frac{1}{4}$ hr.

$8 = 7\frac{}{5}$ $6 = 5\frac{}{9}$ $4 = 3\frac{}{7}$ $3 = 2\frac{}{8}$ $7 = 6\frac{}{10}$

$8\frac{1}{3} = 7\frac{}{3}$ $9\frac{2}{7} = 8\frac{}{7}$ $5\frac{4}{9} = 4\frac{}{9}$ $6\frac{3}{8} = 5\frac{}{8}$ $1\frac{7}{10} = \frac{}{10}$

Mental 59

1. Write in figures: three million four hundred fifty thousand, ninety.
2. Ann has 7 dimes and 2 nickels. Ann has ..... (?) ..... cents.
3. At 9 cents each, what will 7 boxes of crayons cost?
4. $8 - \frac{3}{5} =$ ..... (?) .....
5. Write LXXX in Arabic numbers.

Drill 60

How many yd. in:

6 ft. 9 ft. 15 ft. 21 ft. 36 ft. 36 in.

Multiply by 9: 7, 6, 3, 0, 4, 1, 9, 8, 10, 12

Change to mixed numbers:

$\frac{19}{9}$ $\frac{22}{9}$ $\frac{17}{9}$ $\frac{23}{9}$ $\frac{28}{9}$ $\frac{31}{9}$ $\frac{32}{9}$ $\frac{35}{9}$ $\frac{37}{9}$ $\frac{40}{9}$

$9\frac{5}{4} = 10\frac{}{4}$ $10\frac{7}{4} = 11\frac{}{4}$ $6\frac{10}{7} = 7\frac{}{7}$ $8\frac{7}{5} = 9\frac{}{5}$

LI LIV LIX LVI LXVI

Mental 60

1. $9\frac{5}{4} = 10\frac{}{4}$
2. $6 - \frac{8}{9} =$ ..... (?) .....
3. Change $\frac{31}{9}$ to a mixed number.
4. If Bob can drive 15 miles on 1 gallon of gasoline, how far can he drive on 9 gallons?
5. Write LXVI in Arabic numbers.

Drill 61

Multiply by 6: 7, 4, 2, 0, 5, 9, 3, 6, 8, 10, 12

$\frac{1}{6} = \frac{}{30}$ $\frac{}{48}$ $\frac{}{18}$ $\frac{}{66}$ $\frac{}{36}$ $\frac{}{42}$ $\frac{}{12}$ $\frac{}{72}$ $\frac{}{54}$

Change to improper fractions:

$3\frac{1}{6}$ $4\frac{5}{6}$ $7\frac{1}{6}$ $8\frac{5}{6}$ $9\frac{1}{6}$ $6\frac{3}{4}$ $2\frac{5}{6}$ $6\frac{2}{9}$

Change to mixed numbers:

$\frac{55}{6}$ $\frac{43}{6}$ $\frac{11}{6}$ $\frac{31}{6}$ $\frac{35}{6}$ $\frac{49}{6}$ $\frac{23}{6}$ $\frac{58}{6}$ $\frac{20}{6}$

Add 6 to: 45, 85, 95, 15, 35, 74, 55, 25

Take 6 from: 11, 21, 51, 71, 81, 91, 61, 32, 41

Mental 61

1. When one factor of 42 is 6, what is the other factor?
2. A dealer bought 6 acres of land for $2400. Find the cost of an acre.
3. Write in figures: seven million nine hundred seventeen thousand, three hundred nine.
4. When the cost of meat is $.60 a pound find the cost of 4 lb.
5. Joe had 15 cents. He earned 30¢. He then bought a tennis ball for 39¢. How much had he left?

Drill 62

Multiply by 6: 4, 3, 1, 0, 9, 8, 7, 5, 6, 10, 12

$\frac{5}{6} = \frac{}{42}$ $\frac{}{48}$ $\frac{}{36}$ $\frac{}{18}$ $\frac{}{24}$ $\frac{}{54}$ $\frac{}{30}$ $\frac{}{12}$ $\frac{}{72}$

Change to improper fractions:

$3\frac{1}{6}$ $7\frac{1}{6}$ $8\frac{5}{6}$ $7\frac{1}{6}$ $9\frac{1}{6}$ $5\frac{5}{6}$ $6\frac{1}{6}$ $10\frac{5}{6}$

Add 4 to: 7, 27, 87, 97, 57, 47, 37, 66

Take 4 from: 21, 81, 61, 31, 71, 52, 11, 91, 41

CC MCM MM CDV DCC XCVI

Mental 62

1. At $.25 a can what is the cost of 6 cans of corn?
2. At $.25 a can, how many cans of corn can be bought for $.75?
3. What is the cost of $\frac{1}{2}$ dozen knives at $.60 each?
4. Write in figures: three million two hundred thousand.
5. Find the perimeter of a lot 9 ft. by 6 ft.

Drill 63

Multiply by 6: 9, 2, 8, 0, 5, 4, 3, 12, 7, 1, 6

Change to improper fractions:

$6\frac{3}{5}$ $4\frac{1}{6}$ $7\frac{5}{6}$ $6\frac{2}{3}$ $8\frac{1}{6}$ $12\frac{1}{6}$ $6\frac{4}{7}$

Change to mixed numbers:

$\frac{55}{6}$ $\frac{49}{6}$ $\frac{13}{6}$ $\frac{31}{6}$ $\frac{19}{6}$ $\frac{33}{6}$ $\frac{46}{6}$ $\frac{59}{6}$ $\frac{10}{6}$ $\frac{38}{6}$

How many yd. in:

18 ft. 36 ft. 45 ft. 27 ft. 54 ft. 21 ft.

CC XL XXII LXIV XCI DCC

Mental 63

1. 48 ounces = (?) lb.
2. Find the perimeter of a lot 50 ft. by 160 ft.
3. What will be received for 5 gal. of milk at 10¢ a qt.?
4. Jane practiced 480 min. This was (?) hr.?
5. At $.80 a lb. what would 6 lb. of candy cost?

Drill 64

Multiply by 6: 2, 0, 3, 1, 5, 9, 7, 6, 4, 8

Add 9 to: 32, 52, 72, 62, 82, 12, 41, 92

Take 9 from: 51, 71, 91, 101, 31, 41, 65, 21, 81

Change to improper fractions:

$6\frac{1}{6}$ $7\frac{5}{6}$ $3\frac{1}{6}$ $2\frac{5}{6}$ $6\frac{4}{9}$ $1\frac{5}{6}$ $6\frac{3}{8}$ $4\frac{1}{6}$

Change to mixed numbers:

$\frac{8}{6}$ $\frac{11}{6}$ $\frac{37}{6}$ $\frac{13}{6}$ $\frac{43}{6}$ $\frac{59}{6}$ $\frac{17}{6}$ $\frac{41}{6}$ $\frac{49}{6}$ $\frac{29}{6}$

Mental 64

1. What will 3 pk. of apples cost at $3.20 a bu.?
2. What will 7 lb. of prunes cost at 6¢ per lb.?
3. If 7 jars cost $3 what will 21 jars cost?
4. At 40¢ a pk. what will a bu. of string beans cost?
5. At 6 for 72¢, what is the cost of 1 medal?

Drill 65

Multiply by 6: 1, 0, 5, 7, 6, 8, 4, 3, 2, 9, 10, 12

Change to improper fractions:

$3\frac{5}{6}$ $7\frac{1}{6}$ $8\frac{1}{6}$ $6\frac{3}{4}$ $1\frac{5}{6}$ $2\frac{1}{6}$ $6\frac{4}{9}$ $5\frac{5}{6}$

Change to mixed numbers:

$\frac{73}{6}$ $\frac{55}{6}$ $\frac{11}{6}$ $\frac{31}{6}$ $\frac{35}{6}$ $\frac{23}{6}$ $\frac{49}{6}$ $\frac{43}{6}$ $\frac{47}{6}$

78 + 3 62 + 9 27 + 4 46 + 5 25 + 6

XIX LXXX XLIV XCI DCCV DCCVI

Mental 65

1. Jane had $12 and Helen had $3 less than Jane. How much did they have together?
2. John had 30¢. Mary had 6 times as much. How much had Mary?
3. If 6 lb. of candy cost $2.40, find the cost of 1 lb.
4. The 2:45 train is half an hour late. At what time will it arrive?
5. At 6¢ a foot find the cost of 3 yd. of wire.

Drill 66

Multiply by 7: 2, 7, 5, 4, 3, 0, 8, 9, 6, 10, 12

$\frac{3}{7} = \frac{}{35}$ $\frac{}{14}$ $\frac{}{21}$ $\frac{}{42}$ $\frac{}{28}$ $\frac{}{49}$ $\frac{}{63}$ $\frac{}{56}$ $\frac{}{70}$

Change to mixed numbers:

$\frac{23}{7}$ $\frac{43}{7}$ $\frac{37}{7}$ $\frac{29}{7}$ $\frac{17}{7}$ $\frac{30}{7}$ $\frac{50}{7}$ $\frac{34}{7}$

Add 5 to: 7, 17, 27, 57, 97, 87, 44, 67

$\frac{1}{4}+\frac{1}{4}$ $\frac{1}{7}+\frac{6}{7}$ $\frac{1}{9}+\frac{2}{9}$ $\frac{1}{6}+\frac{2}{6}$

$6-\frac{3}{4}$ $5-\frac{4}{7}$ $8-\frac{2}{9}$ $6-\frac{3}{8}$

Mental 66

1. The remainder is 12 and the subtrahend is 9. Find the minuend.
2. Which is cheaper, 3¢ each or 35¢ a dozen?
3. 21 ft. = (?) yd.
4. At 10¢ a pt. what will 2 qt. of milk cost?
5. At 7¢ each what will 1 doz. oranges cost?

Drill 67

Multiply by 7: 2, 6, 5, 4, 0, 7, 8, 9, 1, 3, 12, 11

Change to mixed numbers:

$\frac{65}{7}$ $\frac{23}{7}$ $\frac{51}{7}$ $\frac{67}{7}$ $\frac{57}{7}$ $\frac{44}{7}$ $\frac{48}{7}$ $\frac{50}{7}$

Change to improper fractions:

$6\frac{3}{7}$ $8\frac{1}{7}$ $9\frac{3}{7}$ $7\frac{4}{9}$ $8\frac{1}{7}$ $5\frac{5}{7}$ $7\frac{3}{4}$ $2\frac{6}{7}$ $5\frac{4}{7}$ $2\frac{2}{7}$

Add 4 to: 18, 28, 78, 35, 68, 58, 98, 48

Take 4 from: 12, 22, 42, 62, 92, 32, 31, 72

$\frac{3}{14}+\frac{4}{14}$ $\frac{3}{10}+\frac{4}{10}$ $\frac{4}{15}+\frac{2}{15}$ $\frac{1}{16}+\frac{1}{16}$

Mental 67

1. 4 gal. = (?) qt.
2. $\frac{11}{12}-\frac{3}{4}$ = (?).
3. Find the perimeter of a 6-in. square.
4. 84 in. = (?) ft.
5. In a class of 45 children $\frac{2}{5}$ of them were absent. How many were absent?

Drill 68

Multiply by 7: 6, 5, 4, 2, 0, 8, 9, 3, 10, 12

Change to mixed numbers:

$\frac{23}{7}$ $\frac{50}{7}$ $\frac{65}{7}$ $\frac{57}{7}$ $\frac{66}{7}$ $\frac{29}{7}$ $\frac{39}{7}$ $\frac{64}{7}$ $\frac{68}{7}$

Change to improper fractions:

$3\frac{3}{7}$ $2\frac{4}{7}$ $1\frac{6}{7}$ $9\frac{2}{7}$ $7\frac{7}{8}$ $4\frac{5}{7}$ $8\frac{1}{7}$ $5\frac{2}{7}$ $7\frac{6}{7}$

$\frac{4}{7}=\frac{}{14}$ $\frac{}{35}$ $\frac{}{63}$ $\frac{}{49}$ $\frac{}{21}$ $\frac{}{56}$ $\frac{}{28}$ $\frac{}{42}$

CCIV XLVIII DCCCVII XLIX MDVI

Mental 68

1. A 5-lb. box of candy cost $2.50. Find the cost per pound.
2. $5-\frac{7}{10}$ = (?).
3. How many inches are there in 7 feet?
4. A dealer sold 10 chairs at $7 each. How much did he receive for them?
5. MCDXCII in Arabic numbers is written (?).

Drill 69

Multiply by 7: 3, 5, 9, 6, 4, 2, 8, 7, 1, 0

Change to improper fractions:

$7\frac{4}{7}$ $8\frac{3}{7}$ $9\frac{6}{7}$ $2\frac{3}{7}$ $7\frac{1}{7}$ $4\frac{3}{7}$ $5\frac{4}{7}$ $10\frac{6}{7}$

$\frac{6}{7}=\frac{}{14}$ $\frac{}{28}$ $\frac{}{42}$ $\frac{}{70}$ $\frac{}{84}$ $\frac{}{49}$ $\frac{}{63}$ $\frac{}{35}$

$\frac{7}{15}+\frac{8}{15}$ $\frac{3}{4}-\frac{1}{4}$ $\frac{9}{10}-\frac{1}{10}$ $\frac{3}{5}+\frac{2}{5}$

Mental 69

1. $3-\frac{4}{5}$ = (?).
2. At 17¢ a quart, find the cost of 2 gal.
3. At 12¢ per ft. what is the cost of 7 ft.
4. At 32¢ a lb. what is the cost of 8 oz. of cheese?
5. What is the perimeter of a field 40 rods long and 20 rods wide?

Drill 70

Multiply by 7: 4, 6, 7, 8, 3, 2, 5, 9, 0, 12

Reduce: $\frac{7}{21}$ $\frac{35}{42}$ $\frac{28}{35}$ $\frac{49}{56}$ $\frac{56}{63}$ $\frac{14}{63}$ $\frac{35}{49}$ $\frac{42}{70}$

Change to improper fractions:

$\frac{19}{7}$ $\frac{23}{7}$ $\frac{25}{7}$ $\frac{40}{7}$ $\frac{64}{7}$ $\frac{27}{7}$ $\frac{46}{7}$ $\frac{37}{7}$ $\frac{52}{7}$ $\frac{58}{7}$

$\frac{1}{2}=\frac{}{4}$ $\frac{1}{3}=\frac{}{6}$ $\frac{1}{4}=\frac{}{8}$ $\frac{1}{5}=\frac{}{10}$ $\frac{1}{6}=\frac{}{12}$

$\frac{3}{4}-\frac{1}{2}$ $\frac{1}{5}-\frac{1}{10}$ $\frac{1}{4}-\frac{1}{8}$ $\frac{1}{6}-\frac{1}{12}$ $\frac{1}{3}-\frac{1}{6}$

Mental 70

1. $2\frac{5}{8}$ in. is how much longer than $\frac{3}{8}$ of an inch?
2. $2\frac{1}{4}+\frac{3}{4}$ = (?).
3. $\frac{1}{6}\times 3$ = (?).
4. 1 ft. 6 in. equals how many feet?
5. At 7¢ each how many bars of soap can be bought for 84¢?

Drill 71

Multiply by 8: 6, 2, 3, 4, 5, 7, 9, 8, 0, 10

Change to improper fractions:

$3\frac{5}{8}$ $6\frac{1}{8}$ $4\frac{3}{8}$ $7\frac{5}{8}$ $1\frac{7}{8}$ $8\frac{3}{5}$ $2\frac{3}{8}$ $8\frac{5}{8}$

Change to mixed numbers:

$\frac{21}{8}$ $\frac{25}{8}$ $\frac{33}{8}$ $\frac{17}{8}$ $\frac{27}{8}$ $\frac{41}{8}$ $\frac{57}{8}$ $\frac{35}{8}$ $\frac{49}{8}$ $\frac{21}{8}$

17+6 87+6 97+6 53−6 43−7

CC MCM CCLII DCCC XLII LXXIX

Mental 71

1. $\frac{1}{6}+\frac{1}{12}=$ (?).
2. $1-\frac{1}{6}=$ (?).
3. $\frac{3}{4}\times\frac{2}{3}=$ (?).
4. Thirty eggs will equal how many dozen?
5. At 8 cents a pint, what will 3 quarts of milk cost?

Drill 72

Multiply by 8: 5, 2, 3, 4, 0, 9, 8, 7, 1, 6, 12

$\frac{1}{8}=\frac{}{56}$ $\frac{7}{8}=\frac{}{64}$ $\frac{5}{8}=\frac{}{72}$ $\frac{1}{8}=\frac{}{80}$ $\frac{3}{8}=\frac{}{24}$ $\frac{5}{8}=\frac{}{40}$

Change to mixed numbers:

$\frac{65}{8}$ $\frac{73}{8}$ $\frac{49}{8}$ $\frac{57}{8}$ $\frac{17}{8}$ $\frac{43}{8}$ $\frac{51}{8}$ $\frac{27}{8}$ $\frac{39}{8}$

Reduce: $\frac{8}{16}$ $\frac{16}{24}$ $\frac{24}{32}$ $\frac{32}{40}$ $\frac{40}{48}$ $\frac{32}{56}$ $\frac{56}{72}$ $\frac{64}{72}$

$\frac{1}{2}\times\frac{1}{2}$ $\frac{3}{4}\times4$ $3\times\frac{2}{3}$ $6\times\frac{5}{6}$

$5-1\frac{1}{2}$ $6\frac{3}{5}-4$ $7\frac{2}{9}-4\frac{2}{9}$ $3-\frac{2}{3}$

Mental 72

1. How many sq.ft. are there in the area of a pane of glass 12 in. square?
2. If 9 yd. cost $18, find the cost of 1 yd. of goods.
3. $\frac{3}{4}\times\frac{5}{6}=$ (?).
4. What part of a year is four months?
5. MDCX = (?).

Drill 73

Multiply by 8: 5, 0, 2, 9, 6, 4, 1, 8, 7, 3

Change to mixed numbers:

$\frac{29}{8}$ $\frac{27}{8}$ $\frac{37}{8}$ $\frac{35}{8}$ $\frac{51}{8}$ $\frac{19}{8}$ $\frac{39}{8}$ $\frac{41}{8}$ $\frac{43}{8}$

Reduce: $\frac{8}{16}$ $\frac{24}{32}$ $\frac{16}{40}$ $\frac{40}{48}$ $\frac{48}{56}$ $\frac{56}{72}$ $\frac{64}{72}$ $\frac{48}{88}$

$3=2\frac{}{10}$ $7=6\frac{}{3}$ $6=5\frac{}{4}$ $5=4\frac{}{2}$ $9=8\frac{}{7}$

Add 6 to: 7, 17, 37, 57, 27, 67, 77, 87

XCII CCLIII LXXIV XLII
DCIX MDIII MDCX CDIV

Mental 73

1. Daniel weighs 80 lb. and Edward weighs $1\frac{3}{4}$ lb. less. What is Edward's weight?
2. Ray buys papers at 3¢ and sells them at 5¢. What is the profit on 20 papers?
3. When milk sells at 80¢ a gal. what is the price per qt.?
4. 30 minutes is what part of an hour?
5. When ribbon sells at 30¢ per yd. what is the cost of 12 in.?

Drill 74

Multiply by 8: 6, 5, 7, 9, 0, 4, 3, 10, 2, 8, 12

$\frac{1}{8}$ of 56, 32, 16, 64, 40, 72, 48, 24, 80

$\frac{3}{8}$ of 56, 32, 16, 64, 40, 72, 48, 24, 80

Change to mixed numbers:

$\frac{9}{8}$ $\frac{11}{8}$ $\frac{15}{8}$ $\frac{13}{8}$ $\frac{19}{8}$ $\frac{21}{8}$ $\frac{23}{8}$ $\frac{27}{8}$ $\frac{29}{8}$ $\frac{25}{8}$

Take 6 from: 13, 27, 47, 37, 57, 87, 67, 97

$\frac{5}{6}\times6$ $\frac{8}{9}\times9$ $\frac{5}{8}\times8$ $\frac{5}{7}\times7$ $\frac{9}{10}\times10$

Mental 74

1. $\frac{5}{8}\times4=$ (?).
2. What part of a day is 1 hr.?
3. If it takes $1\frac{1}{4}$ yd. for 1 apron, how many yards will be needed for 4 aprons?
4. At 40¢ a pound, what will $\frac{3}{8}$ of a pound of meat cost?
5. Write CMIV in Arabic numbers.

Drill 75

Multiply by 8: 3, 0, 2, 9, 1, 5, 8, 4, 7, 6

Change to improper fractions:

$5\frac{3}{8}$ $9\frac{5}{8}$ $6\frac{7}{8}$ $7\frac{3}{8}$ $6\frac{5}{8}$ $8\frac{1}{8}$ $8\frac{5}{8}$ $8\frac{7}{8}$ $8\frac{3}{8}$

$\frac{5}{8} = \frac{}{16}$ $\frac{}{48}$ $\frac{}{64}$ $\frac{}{32}$ $\frac{}{72}$ $\frac{}{56}$ $\frac{}{40}$ $\frac{}{24}$

Reduce: $\frac{16}{24}$ $\frac{24}{32}$ $\frac{32}{40}$ $\frac{40}{72}$ $\frac{56}{64}$ $\frac{64}{72}$ $\frac{48}{56}$

Add 6 to: 8, 18, 38, 58, 78, 98, 47, 68

$3\frac{1}{2} = 2\frac{}{2}$ $4\frac{1}{5} = 3\frac{}{5}$ $5\frac{3}{8} = 4\frac{}{8}$ $2\frac{4}{5} = 1\frac{}{5}$

Mental 75

1. In 1 square foot there are ....(?).... square inches.
2. At \$.15 an hour, how long will it take to earn 90¢?
3. If 8 yards of lace cost \$8.24, what is the cost per yd.?
4. At a rate of 50 m.p.h. how far will a train go in 30 min.?
5. $5\frac{3}{8} = 4\frac{}{8}$

Drill 76

Multiply by 8: 1, 10, 0, 4, 8, 6, 5, 7, 2, 3

Change to mixed numbers:

$\frac{27}{8}$ $\frac{29}{8}$ $\frac{31}{8}$ $\frac{33}{8}$ $\frac{35}{8}$ $\frac{37}{8}$ $\frac{41}{8}$ $\frac{39}{8}$ $\frac{43}{8}$ $\frac{45}{8}$

Find $\frac{3}{8}$ of: 8, 16, 32, 24, 40, 48, 56, 72, 80, 64

Take 6 from: 14, 24, 84, 73, 64, 94, 54, 34, 104

$8\frac{7}{6} = 9\frac{}{6}$ $8\frac{10}{9} = 9\frac{}{9}$ $5\frac{12}{7} = 6\frac{}{7}$ $9\frac{11}{8} = 10\frac{}{8}$

MC MCC MCCV MCCX MCCVI

Mental 76

1. $9\frac{11}{8} = 10\frac{}{8}$
2. At $\$\frac{3}{4}$ a yard, what will 8 yards of silk cost?
3. At a speed of 48 m.p.h., how far will a train go in 15 min.?
4. Find $\frac{5}{8}$ of 40.
5. Write MCCVI in Arabic numbers.

Drill 77

Multiply by 9: 2, 5, 9, 4, 7, 0, 6, 1, 12, 3, 8

Find $\frac{1}{9}$ of 9, 18, 36, 54, 27, 45, 72, 63, 81

Reduce: $\frac{9}{27}$ $\frac{18}{27}$ $\frac{27}{45}$ $\frac{45}{63}$ $\frac{63}{72}$ $\frac{45}{54}$ $\frac{54}{63}$ $\frac{63}{81}$

Add 6 to: 9, 19, 39, 49, 79, 59, 88, 69, 89, 99

$6\frac{7}{5} = 7\frac{}{5}$ $9\frac{11}{10} = 10\frac{}{10}$ $8\frac{5}{3} = 9\frac{}{3}$ $4\frac{7}{6} = 5\frac{}{6}$

From 2 take: $\frac{1}{3}$ $\frac{2}{3}$ $\frac{1}{5}$ $\frac{2}{5}$ $\frac{3}{5}$ $\frac{4}{5}$ $\frac{1}{4}$ $\frac{3}{4}$ $\frac{1}{6}$ $\frac{5}{6}$

DCX DCXV DCXXV DCXXVI
DCXXIV DCXXXIX DCLXV

Mental 77

1. Find the perimeter of a picture frame 12 inches long and 10 inches wide.
2. How many rods are there in 2 miles?
3. How many minutes are there in $\frac{2}{5}$ of an hour?
4. At 60 cents per pound, find the cost of $\frac{7}{10}$ of a pound of candy.
5. Write DCXXVI in Arabic numbers.

Drill 78

Multiply by 9: 9, 5, 3, 7, 0, 6, 1, 8, 2, 10, 4, 12

$\frac{2}{9} = \frac{}{18}$ $\frac{}{36}$ $\frac{}{45}$ $\frac{}{27}$ $\frac{}{54}$ $\frac{}{72}$ $\frac{}{63}$ $\frac{}{81}$ $\frac{}{90}$

Reduce: $\frac{9}{36}$ $\frac{18}{27}$ $\frac{27}{45}$ $\frac{36}{63}$ $\frac{45}{54}$ $\frac{81}{90}$ $\frac{63}{81}$ $\frac{63}{72}$ $\frac{72}{81}$

Take 6 from: 15, 25, 35, 55, 45, 74, 95, 85, 65

From 3 take: $\frac{1}{5}$ $\frac{3}{5}$ $\frac{2}{5}$ $\frac{4}{5}$ $\frac{1}{8}$ $\frac{3}{8}$ $\frac{5}{8}$ $\frac{7}{8}$

Multiply by 4: $\frac{1}{4}$ $\frac{1}{8}$ $\frac{1}{16}$ $\frac{1}{12}$ $\frac{1}{20}$ $\frac{3}{4}$ $\frac{3}{8}$ $\frac{5}{8}$

MDC MCD MCCC MDLV MDLVI

Mental 78

1. Find the perimeter of a board 9 ft. long and 8 ft. wide.
2. How many days are there in 9 weeks?
3. At 45 m.p.h., how far can a car go in $\frac{4}{9}$ of an hour?
4. At 80¢ a pound, what will $\frac{3}{4}$ of a pound of tea cost?
5. $4 \times \frac{5}{8}$ equals ....(?)....

Drill 79

Multiply by 9: 1, 4, 8, 2, 0, 7, 12, 6, 5, 3, 9

Change to improper fractions:

$9\frac{1}{10}$ $9\frac{4}{7}$ $9\frac{3}{8}$ $9\frac{5}{6}$ $9\frac{3}{4}$ $9\frac{2}{3}$ $9\frac{4}{5}$

Change to mixed numbers:

$\frac{29}{9}$ $\frac{31}{9}$ $\frac{34}{9}$ $\frac{35}{9}$ $\frac{37}{9}$ $\frac{40}{9}$ $\frac{43}{9}$ $\frac{44}{9}$ $\frac{46}{9}$

$9\times\frac{1}{3}$ $9\times\frac{2}{3}$ $9\times\frac{2}{9}$ $9\times\frac{5}{9}$

From 3 take: $\frac{1}{3}$ $\frac{2}{3}$ $\frac{3}{4}$ $\frac{5}{6}$ $\frac{1}{8}$ $\frac{3}{8}$ $\frac{5}{8}$ $\frac{7}{8}$ $\frac{1}{10}$ $\frac{3}{10}$

Mental 79

1. At 60¢ a dozen, what will $\frac{2}{3}$ of a dozen cost?
2. At 9¢ each, how many cakes can be bought for $1.80?
3. Florence used $\frac{7}{8}$ of a yard for each towel she made. If she made 8 towels, how much material did she use?
4. How much less than 3 is $2\frac{1}{3}$?
5. How much more than $\frac{1}{14}$ is $\frac{2}{7}$?

Drill 80

Multiply by 9: 4, 7, 2, 0, 6, 10, 5, 8, 3, 12

Take $\frac{1}{9}$ of: 18, 36, 45, 81, 63, 54, 72, 90, 108

Take $\frac{2}{9}$ of: 18, 36, 45, 81, 63, 54, 72, 90, 108

Reduce: $\frac{18}{45}$ $\frac{36}{45}$ $\frac{45}{54}$ $\frac{54}{63}$ $\frac{63}{72}$ $\frac{63}{108}$ $\frac{36}{81}$ $\frac{72}{81}$ $\frac{81}{90}$

Change to mixed numbers:

$\frac{46}{9}$ $\frac{47}{9}$ $\frac{50}{9}$ $\frac{44}{9}$ $\frac{43}{9}$ $\frac{52}{9}$ $\frac{53}{9}$ $\frac{55}{9}$ $\frac{58}{9}$ $\frac{70}{9}$

From 4 take $3\frac{5}{6}$ $3\frac{4}{9}$ $3\frac{7}{8}$ $3\frac{9}{10}$ $3\frac{8}{11}$ $3\frac{7}{10}$

Mental 80

1. 9 feet equals ....(?)..... yd.
2. 9 feet equals ....(?)..... inches.
3. A rectangle is 20 ft. long, and $12\frac{1}{2}$ ft. wide. Find its perimeter.
4. At $.60 an hour, how much will Tom earn in 9 hr.?
5. Mary had 4 yards of material. She used $3\frac{7}{8}$ yards. How much had she left?

Drill 81

Multiply by 9:

0, 1, 3, 7, 2, 9, 4, 10, 6, 5, 12, 8, 11

Take $\frac{1}{9}$ of: 45, 99, 54, 18, 63, 27, 72, 108, 36

Take $\frac{5}{9}$ of: 45, 99, 54, 18, 63, 27, 72, 108, 36

Reduce: $\frac{45}{63}$ $\frac{18}{27}$ $\frac{27}{36}$ $\frac{54}{63}$ $\frac{63}{72}$ $\frac{72}{108}$ $\frac{36}{81}$ $\frac{9}{45}$

Add 6 to: 15, 25, 35, 55, 53, 65, 85, 75

Take 6 from: 11, 21, 51, 74, 31, 41, 91, 61

From 5 take: $\frac{3}{4}$ $\frac{5}{8}$ $\frac{2}{3}$ $\frac{4}{9}$ $\frac{3}{7}$ $\frac{7}{10}$ $\frac{5}{12}$ $\frac{7}{12}$

Mental 81

1. At 60¢ a dozen, what will 4 pencils cost?
2. Find the cost of 60 yd. of ribbon at 3 cents a yard.
3. A piece of ribbon containing 30 yd. cost $1.80. How much was that a yard?
4. John weighed $62\frac{1}{2}$ pounds. He gained $1\frac{1}{2}$ pounds. How much did he weigh then?
5. Write DCCIV in Arabic numbers.

Drill 82

Multiply by 9: 3, 9, 2, 7, 5, 4, 10, 6, 1, 8

Take $\frac{1}{9}$ of: 27, 81, 18, 63, 45, 36, 90, 54, 9, 72

Take $\frac{7}{9}$ of: 27, 81, 18, 63, 45, 36, 90, 54, 9, 72

Change to improper fractions:

$10\frac{1}{9}$ $7\frac{4}{9}$ $6\frac{5}{9}$ $2\frac{7}{9}$ $9\frac{3}{4}$ $9\frac{2}{5}$ $9\frac{5}{8}$ $9\frac{2}{3}$

From $\frac{1}{2}$ take: $\frac{1}{4}$ $\frac{1}{8}$ $\frac{1}{16}$ $\frac{1}{20}$ $\frac{1}{24}$

MCVI DCL DCLVI DCLXI DCLIV

Mental 82

1. At 80¢ a dozen, find the cost of 3 grapefruit.
2. Find the area of a window 3 ft. by $1\frac{1}{3}$ ft.
3. If 1 inch represents 60 ft., 9 inches will represent ....(?)..... ft.
4. From $1\frac{1}{5}$ take $\frac{1}{10}$.
5. If a small statue of Our Lady costs $.50, what will 9 cost?

Drill 83

Multiply by 8:

6, 3, 9, 2, 0, 5, 8, 7, 1, 8, 11

Change to mixed numbers:

$\frac{35}{8}$ $\frac{47}{8}$ $\frac{43}{8}$ $\frac{51}{8}$ $\frac{65}{8}$ $\frac{59}{8}$ $\frac{63}{8}$ $\frac{75}{8}$ $\frac{29}{8}$

Take 8 from: 25, 24, 27, 23, 26, 28, 22, 21

How many sq.yd. are there in: 18 sq. ft. 36 sq.ft. 54 sq.ft. 27 sq.ft. 63 sq.ft. 72 sq.ft. 81 sq.ft.

From 2 take: $\frac{5}{9}$ $\frac{7}{8}$ $\frac{5}{6}$ $\frac{5}{12}$ $\frac{7}{9}$ $\frac{7}{10}$ $\frac{3}{10}$

Mental 83

1. Mr. Benson drove his car 824 miles in 8 days. How many miles did he average per day?
2. Tom had \$2. He spent $\$\frac{7}{8}$. He had (?) left.
3. How many square yards are there in 63 sq. ft.?
4. Write in figures: nine million four hundred three thousand fifty-nine.
5. Change $\frac{75}{8}$ to a mixed number.

Drill 84

Multiply by 7:

0, 3, 8, 2, 5, 9, 4, 10, 6, 7, 12

Change to mixed numbers:

$\frac{32}{7}$ $\frac{37}{7}$ $\frac{43}{7}$ $\frac{45}{7}$ $\frac{47}{7}$ $\frac{50}{7}$ $\frac{54}{7}$ $\frac{58}{7}$

Take 7 from: 25, 26, 24, 27, 23, 21, 20, 22

Find $\frac{1}{7}$ of: 49, 21, 56, 70, 28, 63, 35, 42, 14

Find $\frac{2}{7}$ of: 49, 21, 56, 70, 28, 63, 35, 42, 14

LXXV LXXVI LXXIX LXXXIV LXXXVI LXXXIX LXXXVIII

Mental 84

1. The fifth grade boys are hiking back to camp which is $7\frac{1}{2}$ miles away. After having walked $3\frac{1}{4}$ miles, how far do they still have to go?
2. How many minutes are there in $\frac{3}{4}$ hr.?
3. If a pigeon can fly 15 miles in an hour, how far can he fly in 45 min.?
4. If 7 chairs cost \$49.28, how much apiece is that?
5. Find the perimeter of a 7-inch square.

Drill 85

Multiply by 6: 3, 7, 2, 0, 9, 6 5, 1, 4, 8, 12

Take $\frac{1}{6}$ of: 42, 54, 18, 66, 12, 24, 30, 48, 36

Take $\frac{5}{6}$ of: 42, 54, 18, 66, 12, 24, 30, 48, 36

Add 6 to: 25, 24, 23, 27, 29, 28, 26, 20, 21

Take 6 from: 31, 37, 30, 29, 35, 32, 34, 27, 33

What part of an hour is: 30 min. 15 min. 45 min. 10 min. 20 min. 5 min.

Mental 85

1. Marie weighs $63\frac{1}{4}$ pounds. This is $\frac{3}{4}$ of a pound less than Jane weighs. What is Jane's weight?
2. Find $\frac{5}{6}$ of 42.
3. How many $\frac{1}{2}$'s are there in 4?
4. A pilot flew 1224 miles in 6 hr. What was his average hourly speed?
5. What part of an hour is 10 minutes?

Drill 86

Multiply by 5: 2, 4, 8, 6, 3, 0, 5, 9, 7, 12, 1, 11

Take $\frac{1}{5}$ of: 25, 40, 10, 60, 15, 30, 55, 35, 5, 20

Take $\frac{4}{5}$ of: 25, 40, 10, 60, 15, 30, 55, 35, 5, 20

Add 5 to: 27, 26, 29, 25, 24, 28, 30, 33

From 5 take: $\frac{4}{5}$ $\frac{7}{8}$ $\frac{3}{4}$ $\frac{2}{3}$ $\frac{5}{9}$ $\frac{8}{9}$ $\frac{3}{10}$ $\frac{7}{10}$ $\frac{9}{10}$ $\frac{1}{10}$

CMIV CMLIX CMLVI CMLIX CMLIV CMXLIX CMXCIX

Mental 86

1. Find the perimeter of a 5-inch square.
2. Paul weighs $59\frac{3}{8}$ lb. and he should weigh 71 lb. How many lb. underweight is he?
3. When milk is 9¢ a pt. what is the cost of 4 qt.?
4. At 24 m.p.h. how far can a boat go in $\frac{1}{3}$ hr.?
5. What is the sum of $6\frac{3}{4}$ and $2\frac{1}{4}$?

Drill 87

Multiply by 4:

0, 5, 9, 3, 10, 6, 2, 7, 1, 4, 11, 8, 12

Take $\frac{1}{4}$ of:

20, 44, 36, 24, 12, 4, 8, 28, 32, 40, 16

Take $\frac{3}{4}$ of:

20, 44, 36, 24, 12, 4, 8, 28, 32, 40, 16

Add 4 to: 28, 26, 27, 25, 30, 32, 34, 29

Take 4 from: 33, 30, 32, 31, 38, 34, 36, 38

From $\frac{1}{2}$ take: $\frac{1}{4}$ $\frac{1}{8}$ $\frac{1}{6}$ $\frac{1}{10}$ $\frac{1}{12}$ $\frac{1}{14}$ $\frac{1}{16}$ $\frac{1}{18}$ $\frac{1}{20}$

Mental 87

1. Jane had a piece of lace $1\frac{5}{8}$ yd. long. She used $\frac{3}{8}$ of a yard. How much had she left?
2. John had 40¢. He spent $\frac{3}{4}$ of it. How much did he spend?
3. How many $\frac{1}{4}$'s are there in 5?
4. Find the value of $\frac{1}{2} \div \frac{1}{2}$.
5. Teresa used $1\frac{1}{4}$ cupfuls of brown sugar and $1\frac{1}{4}$ cupfuls of white sugar. How much sugar did she use?

Drill 88

Add 8 to: 7, 6, 5, 9, 0, 1, 4, 3, 8, 2

Take 8 from: 16, 11, 12, 20, 17, 13, 15, 14, 19

Multiply by 3: 3, 5, 0, 9, 7, 1, 12, 8, 6, 4

Take $\frac{1}{3}$ of: 12, 30, 15, 24, 27, 18, 9, 6, 36, 33

Take $\frac{2}{3}$ of: 12, 30, 15, 24, 27, 18, 9, 6, 36, 33

Reduce: $\frac{9}{15}$ $\frac{15}{24}$ $\frac{24}{27}$ $\frac{12}{18}$ $\frac{21}{24}$ $\frac{21}{27}$ $\frac{33}{36}$ $\frac{27}{30}$

How many inches in:

3 ft. 2 ft. 6 ft. 4 ft. 1 yd. 2 yd.

Mental 88

1. Find the area of a rug 8 ft. by 4 ft.
2. John's father earned $180 in 3 weeks. What did he average in a week?
3. What part of a foot is 6 inches?
4. Joseph is 63 inches tall. Mary is $\frac{2}{3}$ as tall. How tall is Mary?
5. How much more than $\frac{3}{4}$ is 2?

Drill 89

Add 7 to: 27, 26, 23, 24, 29, 25, 28, 22

Take 7 from: 34, 33, 30, 31, 36, 32, 35, 29

Take $\frac{1}{3}$ of: 12, 15, 6, 24, 9, 18, 27, 21, 30

Take $\frac{2}{3}$ of: 12, 15, 6, 24, 9, 18, 27, 21, 30

Take $\frac{1}{4}$ of: 8, 36, 12, 20, 32, 44, 16, 28, 48

Take $\frac{3}{4}$ of: 8, 36, 12, 20, 32, 44, 16, 28, 48

How many ft. in 12 in. 36 in. 24 in.
3 yd. 9 yd. 12 yd. 6 yd. 15 yd.

Mental 89

1. Find the perimeter of a blackboard 4 ft. long and $3\frac{1}{2}$ ft. wide?
2. Find the area of a sheet of paper 2 ft. long and $1\frac{1}{2}$ ft. wide.
3. Tom had 24 cents. He spent $\frac{3}{4}$ of this money for his lunch. How much did he spend for lunch?
4. How much more than $2\frac{1}{4}$ is $2\frac{1}{2}$?
5. How much less than $\frac{3}{5}$ is $\frac{3}{10}$?

Drill 90

$\frac{3}{5} =$ $\frac{}{15}$ $\frac{}{30}$ $\frac{}{60}$ $\frac{}{25}$ $\frac{}{45}$ $\frac{}{35}$ $\frac{}{30}$ $\frac{}{40}$ $\frac{}{45}$

$\frac{3}{5}$ of: 15, 30, 60, 25, 45, 35, 30, 40, 20

$\frac{1}{6}$ of: 18, 24, 36, 30, 48, 42, 54, 48, 60

$\frac{1}{7}$ of: 14, 35, 42, 49, 56, 63, 28, 84, 70

From 5 take: $\frac{3}{8}$ $\frac{5}{8}$ $\frac{1}{8}$ $\frac{2}{7}$ $\frac{5}{7}$ $\frac{6}{7}$ $\frac{3}{4}$ $\frac{4}{7}$

XCVII XCIX CXII CXVI CXVII

Mental 90

1. At $\$1\frac{1}{2}$ a yd. find the cost of 2 yd.
2. At $\$\frac{1}{4}$ a yd. how many yd. can be bought for $2?
3. Tom had 21 marbles. He gave $\frac{2}{7}$ of them to George. How many did he give to George?
4. How much more than $3\frac{1}{4}$ is $3\frac{1}{2}$?
5. From the sum of 15 and 5 take $\frac{1}{2}$ of 10.

Drill 91

$\frac{1}{8}$ of: 16, 32, 72, 48, 24, 40, 56, 64, 96

$\frac{1}{9}$ of: 9, 27, 72, 45, 54, 18, 99, 63, 36

Change to mixed numbers:

$\frac{21}{8}$ $\frac{59}{8}$ $\frac{46}{8}$ $\frac{67}{8}$ $\frac{35}{8}$ $\frac{19}{8}$ $\frac{76}{8}$ $\frac{11}{8}$ $\frac{77}{8}$ $\frac{29}{8}$ $\frac{37}{8}$

$\frac{39}{9}$ $\frac{77}{9}$ $\frac{59}{9}$ $\frac{42}{9}$ $\frac{48}{9}$ $\frac{33}{9}$ $\frac{52}{9}$ $\frac{21}{9}$ $\frac{30}{9}$ $\frac{65}{9}$ $\frac{87}{9}$

$2\frac{1}{2} = 1\frac{}{2}$ $3\frac{3}{4} = 2\frac{}{4}$ $8\frac{5}{6} = 7\frac{}{6}$ $4\frac{2}{3} = 3\frac{}{3}$

How many months are there in:

1 yr. $\frac{1}{3}$ yr. $\frac{1}{6}$ yr. $\frac{1}{12}$ yr. $\frac{1}{4}$ yr. 2 yr.

Mental 91

1. If there are $\frac{1}{2}$ doz. Easter eggs in a box, how many dozen are there in 4 boxes?
2. If $\frac{1}{2}$ doz. erasers fit in a box, how many boxes are needed for 4 doz. erasers?
3. Tom earned 40¢. He spent $\frac{1}{4}$ of it. How much had he left?
4. What part of a year is 4 months?
5. How many months are there in $4\frac{1}{2}$ yr.?

Drill 92

$\frac{1}{3}$ of: 18, 36, 21, 3, 12, 24, 9, 33, 6, 15

$\frac{1}{4}$ of: 48, 4, 24, 8, 36, 12, 32, 16, 28

Change to mixed numbers:

$\frac{22}{3}$ $\frac{29}{3}$ $\frac{19}{3}$ $\frac{14}{3}$ $\frac{11}{3}$ $\frac{25}{3}$ $\frac{8}{3}$ $\frac{17}{3}$

$\frac{29}{4}$ $\frac{19}{4}$ $\frac{26}{4}$ $\frac{35}{4}$ $\frac{10}{4}$ $\frac{37}{4}$ $\frac{23}{4}$ $\frac{13}{4}$

$2\frac{5}{4} = 3\frac{}{4}$ $6\frac{4}{3} = 7\frac{}{3}$ $8\frac{5}{4} = 9\frac{}{4}$ $5\frac{7}{3} = 7\frac{}{3}$

How many days in:

1 wk. $\frac{1}{7}$ wk. $\frac{2}{7}$ wk. $\frac{4}{7}$ wk. $\frac{6}{7}$ wk. $\frac{3}{7}$ wk.

Mental 92

1. Which is greater and by how much: 3 quarts or 7 pints?
2. John had 36¢. If he spent $\frac{1}{4}$ of his money, how much had he left?
3. Write in figures: seven million, five hundred eight thousand, six hundred three.
4. Add $\frac{1}{3}$ of 21 to $\frac{1}{4}$ of 24.
5. How many days are there in $\frac{5}{7}$ of a week?

Drill 93

$\frac{1}{5}$ of: 25, 35, 20, 40, 30, 50, 45, 55, 60

$\frac{1}{6}$ of: 36, 18, 24, 48, 30, 42, 54, 60, 72

Change to mixed numbers:

$\frac{22}{5}$ $\frac{27}{5}$ $\frac{39}{5}$ $\frac{42}{5}$ $\frac{24}{5}$ $\frac{33}{5}$ $\frac{44}{5}$ $\frac{47}{5}$ $\frac{49}{5}$ $\frac{43}{5}$

$\frac{37}{6}$ $\frac{39}{6}$ $\frac{29}{6}$ $\frac{49}{6}$ $\frac{53}{6}$ $\frac{35}{6}$ $\frac{43}{6}$ $\frac{55}{6}$ $\frac{59}{6}$ $\frac{19}{6}$

$4\frac{7}{6} = 5\frac{}{6}$ $6\frac{9}{5} = 7\frac{}{5}$ $3\frac{15}{8} = 4\frac{}{8}$ $7\frac{9}{4} = 9\frac{}{4}$

How many sq. ft. in:

1 sq. yd. $\frac{1}{3}$ sq. yd. $\frac{1}{9}$ sq. yd. 2 sq. yd.

Mental 93

1. Madge had 48¢. She spent $\frac{1}{6}$ of it. How much had she left?
2. Change $\frac{59}{6}$ to a mixed number.
3. $7\frac{9}{4} = 9\frac{}{4}$.
4. Take $\frac{1}{6}$ of 54 from 10.
5. From 6 feet take 1 yard.

Drill 94

$\frac{1}{7}$ of: 14, 35, 21, 42, 84, 28, 56, 63, 49, 70

$\frac{1}{8}$ of: 64, 24, 32, 56, 72, 40, 48, 80, 96

Change to mixed numbers:

$\frac{37}{7}$ $\frac{45}{7}$ $\frac{24}{7}$ $\frac{30}{7}$ $\frac{59}{7}$ $\frac{67}{7}$ $\frac{52}{7}$ $\frac{19}{7}$ $\frac{57}{7}$ $\frac{69}{7}$

$\frac{27}{8}$ $\frac{39}{8}$ $\frac{57}{8}$ $\frac{75}{8}$ $\frac{45}{8}$ $\frac{51}{8}$ $\frac{53}{8}$ $\frac{59}{8}$ $\frac{77}{8}$ $\frac{79}{8}$

$3\frac{4}{5} = 2\frac{}{5}$ $2\frac{5}{8} = 1\frac{}{8}$ $4\frac{7}{9} = 3\frac{}{9}$ $6\frac{3}{4} = 5\frac{}{4}$

How many sq. ft. in:

1 sq. yd. 30 sq. yd. 5 sq. yd. 8 sq. yd.

Mental 94

1. Paul had 32 marbles. He lost $\frac{1}{8}$ of them. How many had he left?
2. Take $\frac{1}{8}$ of 40 from 11.
3. Write in figures: six million, four hundred twenty thousand, three hundred four.
4. Change $\frac{75}{8}$ to a mixed number.
5. From $2\frac{1}{3}$ yards take $\frac{1}{6}$ of a yard.

Drill 95

$\frac{1}{9}$ of: 27, 45, 36, 18, 54, 81, 63, 90, 72, 108

$\frac{1}{10}$ of: 60, 20, 90, 30, 50, 70, 40, 80, 100, 120

Change to mixed numbers:

$\frac{20}{9}$ $\frac{25}{9}$ $\frac{47}{9}$ $\frac{50}{9}$ $\frac{40}{9}$ $\frac{43}{9}$ $\frac{38}{9}$ $\frac{41}{9}$ $\frac{43}{9}$ $\frac{55}{9}$ $\frac{64}{9}$

$\frac{68}{9}$ $\frac{70}{9}$ $\frac{73}{9}$ $\frac{76}{9}$ $\frac{79}{9}$ $\frac{82}{9}$ $\frac{83}{9}$ $\frac{21}{10}$ $\frac{33}{10}$ $\frac{49}{10}$

How many qt. in:

1 pt. 2 pt. 4 pt. 1 gal. 3 gal. 5 gal.

MDC MDCX MDCIX MDCXX
MDCXL CMXL MCCII

Mental 95

1. Mary had 36 yards of ribbon. She used $\frac{1}{9}$ of it. How much had she left?
2. Add $\frac{1}{10}$ of 50 to 7.
3. If Ann used $\frac{2}{3}$ of a yard of ribbon for 1 bow, how many yards did she use for 6 bows?
4. Mother used $2\frac{1}{2}$ grapefruit to serve 5 people. What part of a grapefruit did she serve to each?
5. Write in Arabic numbers MDCL.

Drill 96

$\frac{1}{3}$ of: 9, 12, 27, 15, 6, 21, 24, 18, 30, 36

$\frac{1}{4}$ of: 12, 20, 36, 16, 28, 8, 32, 24, 48, 40

$\frac{1}{5}$ of: 30, 40, 35, 10, 25, 45, 20, 15, 50, 60

Change to mixed numbers:

$\frac{20}{3}$ $\frac{10}{3}$ $\frac{14}{3}$ $\frac{29}{3}$ $\frac{23}{3}$ $\frac{14}{3}$ $\frac{25}{3}$ $\frac{21}{4}$ $\frac{23}{4}$ $\frac{27}{4}$

$\frac{33}{4}$ $\frac{31}{4}$ $\frac{39}{4}$ $\frac{17}{5}$ $\frac{23}{5}$ $\frac{31}{5}$ $\frac{44}{5}$ $\frac{29}{5}$ $\frac{34}{5}$ $\frac{39}{5}$

Reduce: $\frac{40}{45}$ $\frac{35}{40}$ $\frac{24}{28}$ $\frac{32}{36}$ $\frac{18}{24}$ $\frac{21}{27}$ $\frac{15}{24}$ $\frac{25}{40}$ $\frac{28}{36}$

Mental 96

1. Multiply $\frac{1}{4}$ of 12 by $\frac{1}{5}$ of 20.
2. Find the perimeter of a rectangle 10 ft. by 5 ft.
3. Carol had 20 pieces of candy. She gave $\frac{1}{5}$ of them to Grace. How many had she left?
4. Find the value of $6 \div \frac{3}{4}$.
5. Frank has \$3 in quarters ($\$\frac{1}{4}$). How many quarters has he?

Drill 97

Find $\frac{1}{6}$ of: 24, 36, 54, 18, 30, 60, 48, 42, 72, 66

$\frac{1}{7}$ of: 21, 70, 35, 63, 49, 28, 56, 42, 84, 77

Reduce: $\frac{24}{36}$ $\frac{18}{54}$ $\frac{30}{42}$ $\frac{48}{54}$ $\frac{54}{72}$ $\frac{21}{70}$ $\frac{35}{63}$ $\frac{49}{56}$ $\frac{42}{77}$ $\frac{56}{84}$

Change to improper fractions:

$4\frac{5}{6}$ $6\frac{3}{7}$ $5\frac{4}{7}$ $8\frac{5}{6}$ $9\frac{1}{6}$ $7\frac{5}{7}$ $8\frac{2}{7}$ $7\frac{1}{6}$ $4\frac{3}{7}$

Change to mixed numbers:

$\frac{17}{6}$ $\frac{25}{6}$ $\frac{29}{6}$ $\frac{40}{7}$ $\frac{25}{7}$ $\frac{50}{6}$ $\frac{59}{7}$ $\frac{64}{7}$ $\frac{45}{7}$ $\frac{55}{6}$

Mental 97

1. From $\frac{1}{6}$ of 54 take $\frac{1}{7}$ of 49.
2. Find the cost of $\frac{5}{6}$ of a dozen oranges at 48¢ a dozen.
3. How many pieces $\frac{3}{4}$ of a yard long can be cut from 6 yards of ribbon?
4. Mother made 63 cookies. The children ate $\frac{1}{7}$ of them. How many were left?
5. MDCCCLX = ... (?) .....

Drill 98

$\frac{1}{2}+\frac{1}{4}$	$\frac{1}{2}-\frac{1}{4}$	$\frac{1}{2}\times\frac{1}{4}$	$\frac{1}{2}\div\frac{1}{4}$
$\frac{1}{3}+\frac{1}{6}$	$\frac{1}{3}-\frac{1}{6}$	$\frac{1}{3}\times\frac{1}{6}$	$\frac{1}{3}\div\frac{1}{6}$
$\frac{1}{5}+\frac{1}{10}$	$\frac{1}{5}-\frac{1}{10}$	$\frac{1}{5}\times\frac{1}{10}$	$\frac{1}{5}\div\frac{1}{10}$
$\frac{1}{4}+\frac{1}{8}$	$\frac{1}{4}-\frac{1}{8}$	$\frac{1}{4}\times\frac{1}{8}$	$\frac{1}{4}\div\frac{1}{8}$

1 mile = ... (?) ..... rd., ... (?) ..... yd., ... (?) ..... ft.

1 year = ... (?) ..... months, ... (?) ..... weeks, ... (?) ..... days

MD MDC MDCX MDXC MDCL

Mental 98

1. From $\frac{1}{4}$ of 40 take $\frac{1}{8}$ of 80.
2. Find the area of a 7-inch square.
3. Find the perimeter of a 9-inch square.
4. Find the value of $\frac{1}{4} \div \frac{1}{8}$ ..... (?) ..... .
5. MDXC = ... (?) ..... .

MDXC = 904

Drill 99

$\frac{1}{2}+\frac{1}{2}$	$\frac{1}{2}-\frac{1}{2}$	$\frac{1}{2}\times\frac{1}{2}$	$\frac{1}{2}\div\frac{1}{2}$
$\frac{1}{3}+\frac{1}{3}$	$\frac{1}{3}-\frac{1}{3}$	$\frac{1}{3}\times\frac{1}{3}$	$\frac{1}{3}\div\frac{1}{3}$
$\frac{1}{4}+\frac{1}{4}$	$\frac{1}{4}-\frac{1}{4}$	$\frac{1}{4}\times\frac{1}{4}$	$\frac{1}{4}\div\frac{1}{4}$
$\frac{1}{5}+\frac{1}{5}$	$\frac{1}{5}-\frac{1}{5}$	$\frac{1}{5}\times\frac{1}{5}$	$\frac{1}{5}\div\frac{1}{5}$
$\frac{1}{5}=\frac{}{10}$	$\frac{1}{2}=\frac{}{4}$	$\frac{1}{3}=\frac{}{6}$	$\frac{1}{4}=\frac{}{8}$
$\frac{2}{5}=\frac{}{10}$	$\frac{2}{3}=\frac{}{6}$	$\frac{3}{4}=\frac{}{8}$	$\frac{1}{8}=\frac{}{16}$

Mental 99

1. At \$.90 a yard, what will 9 yards cost?
2. At 90 cents a yard, what will $\frac{2}{3}$ of a yard cost?
3. If 8 yards cost \$.72, what will 1 yard cost?
4. If $\frac{2}{3}$ of a yard cost 60¢, what will 1 yard cost?
5. Tom earned 81 cents. He spent $\frac{1}{9}$ of it. How much had he left?

Drill 100

Find $\frac{1}{8}$ of: 32, 96, 48, 64, 24, 80, 72, 56, 40, 16

$\frac{1}{9}$ of: 27, 45, 18, 72, 54, 81, 36, 63, 90, 108

Reduce: $\frac{24}{32}$ $\frac{48}{56}$ $\frac{40}{64}$ $\frac{27}{45}$ $\frac{54}{63}$ $\frac{81}{90}$ $\frac{72}{81}$ $\frac{63}{72}$ $\frac{56}{64}$

Change to mixed numbers:

$\frac{29}{9}$ $\frac{35}{8}$ $\frac{38}{9}$ $\frac{53}{8}$ $\frac{59}{8}$ $\frac{35}{9}$ $\frac{47}{9}$ $\frac{59}{8}$ $\frac{49}{9}$ $\frac{52}{9}$

Change to improper fractions:

$4\frac{7}{9}$ $3\frac{5}{8}$ $8\frac{8}{9}$ $5\frac{4}{9}$ $7\frac{3}{8}$ $6\frac{5}{9}$ $6\frac{3}{8}$ $5\frac{7}{8}$

Mental 100

1. Find the area of a rectangle $3\frac{1}{2}$ ft. by 2 ft.
2. Find the perimeter of a rectangle 15 ft. by 10 ft.
3. At 40¢ a dozen, how much will 9 cost? ($\frac{3}{4}$ of doz.) ....(?)....
4. To $\frac{1}{8}$ of 48 add $\frac{1}{9}$ of 27 ....(?)....
5. Bill had 27 cents. He spent $\frac{1}{9}$ of it. How much had he left?

Drill 101

Give the number of days in each of the following months: November, January, April, May, December, June, September, October.

How many inches are there in:
1 yd., 1 ft., $\frac{1}{2}$ yd., $\frac{1}{3}$ ft., $\frac{2}{3}$ ft., $\frac{1}{4}$ ft., $\frac{3}{4}$ ft.

How many quarts are there in:
1 gal., 2 gal., 3 gal., 2 pt., 4 pt., 6 pt., $\frac{1}{4}$ gal.

Change to Arabic numbers:
DC MDCL CDLV DCXL DCL

Mental 101

1. If 1 inch on a map represents 50 miles, how many miles are represented by 5 inches?
2. To find the cost of 1, the process is ....(?)....
3. If 8 articles cost 40¢, what is the cost of 1?
4. If $\frac{3}{4}$ of a yard cost 30¢, what is the cost of 1 yd.?
5. MDC = ...(?)....

Drill 102

What part of 24 is: 6, 12, 4, 8, 3, 2?
What part of 60 is: 30, 12, 15, 2, 5, 4?
What part of 48 is: 6, 12, 24, 8, 2, 4?
What part of 40 is: 10, 5, 8, 4, 20, 2?
What part of an hour is:
30 min., 20 min., 40 min., 10 min., 50 min.?
What part of a day is:
12 hr., 6 hr., 4 hr., 8 hr., 2 hr., 3 hr., 1 hr.?
What part of a foot is:
6 in., 1 in., 2 in., 4 in., 3 in.?

Mental 102

1. What part of an hour is 45 min.?
2. What part of a day is 2 hours?
3. What part of a foot is 4 inches?
4. Mother made 50 pieces of fudge. She gave the children $\frac{4}{5}$ of them. How many pieces were left?
5. MDCL = ...(?)....